VICTOR C. BELL'S

POPULAR ESSAYS

ON THE CARE OF THE

TEETH AND MOUTH

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"SOUND TEETH ARE MORE VALUABLE THAN DIAMONDS."
—*Cervantes*

This tooth brush enables you to practise what your dentist has been preaching to you for years.

POPULAR ESSAYS

UPON THE CARE OF THE

TEETH AND MOUTH

BY VICTOR C. BELL, A.B., D.D.S.

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THIS BOOK HAS RECEIVED "HONORABLE MENTION" AT THE PAN-AMERICAN EXPOSITION

ELEVENTH EDITION, CAREFULLY REVISED

ADOPTED BY THE BOARD OF EDUCATION OF NEW YORK CITY AS A TEXT-BOOK AND SUPPLEMENTARY READER IN THE SCHOOLS

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PREFACE.

This work is the outgrowth of the observations made in daily practice. For years the author has noted and deplored the lack of information upon dental subjects that is displayed by people of otherwise great general intelligence. This is the more to be lamented, because the subject is a vital one, and the consequences of ignorance must be felt during the whole life. He candidly believes that, were the information contained in this little book generally diffused and its teachings well followed, not only would very much pain and suffering be prevented, but the general term of human life would be perceptibly lengthened.

This book has, therefore, been prepared in the hope that it may in some way be used to spread a knowledge of the importance of the dental organs among the people, especially the young, through the medium of the schools. It has not been written especially for dentists, and hence simplicity of language has been cultivated, and technical terms have been avoided. But at the same time the hope

is indulged that professional men may find it useful for the purposes indicated, and it is therefore dedicated to dental practitioners and their patients.

The author desires to acknowledge the great obligations under which he rests to Professors W. C. Barrett, Frank Abbott, Dr. William Carr, and J. B. Littig, for valuable suggestions and assistance.

NEW YORK, *Oct.* 1, 1912.

PREFACE TO THE ELEVENTH EDITION.

This edition has been revised throughout, and a few additions made to the text.

I have reason to congratulate myself on the fact that my work has been so favorably received, several large editions having been rapidly exhausted. I do not assign this result so much to the merits of this little volume as I do to the fact that the special study of the mouth and teeth has been recognized as essential to a comprehensive knowledge of hygiene; and it is very gratifying to note that among the first to acknowledge this truth by adopting this book in the curriculum of their schools were the Board of Education of New York City and the normal schools of New England. Since then the book has also been adopted by the Boards of Education of Philadelphia, Camden and several other leading cities throughout the Union.

Victor C. Bell, D.D.S.

New York, *Jan. 1st,* 1914.

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CARE OF THE TEETH AND MOUTH.

CHAPTER I.

INTRODUCTORY.

"Doctor, does not the cleaning of the teeth by dental instruments ruin them?"

"In filling the teeth are not their nerves killed, and their vitality thus destroyed?"

"Can aching teeth be made serviceable?"

"Is not the gas that is administered for extraction very dangerous in its action?"

"Are not false teeth taken from the dead?"

"Is not food tasteless to the wearer of artificial teeth?"

Questions such as these are constantly asked the practicing dentist.

"Miss A., why do you not attend to your teeth?"

"O! I am so afraid of the dentist and his torturing instruments."

"Mr. B., why do you not have your teeth put in order?"

"Well, I'm too busy, and just now they do not bother me."

Thus it is that Miss A. and Mr. B. neglect these essential organs, until decay and disease have so far progressed that they are beyond the skill of the dentist, and irretrievably lost.

How often do patients present themselves to the dentist with teeth so filthy that one recoils with disgust and aversion at beholding them. Add to this a number of ulcerated roots, or decayed teeth with large cavities in which decomposing food remains for weeks and months, and you will no longer wonder why sometimes the breath of an individual is so offensive and foul that his presence is unbearable. Wherever there is decomposition of organic matter, there innumerable colonies of microbes, the germs of disease, are generated. Through a mouth thus infected, can any individual pass his food and yet wonder why he suffers from indigestion? An eminent writer, speaking upon this subject, says:

"The stomach may be compared to a stove; the food, to the fuel consumed by the stove; and life,

to the heat given off by the glowing coals. The stomach is an excellent stove, and will burn much bad fuel. But have a care lest it rebel, and the fire be extinguished." To maintain a vigorous and sustained vital glow, the food taken into the stomach must be thoroughly ground by the teeth, and mixed with the saliva, and it must not be mingled with any deleterious accumulations in the mouth.

The Stomach.

Good health demands thorough digestion; thorough digestion demands thorough mastication, and thorough mastication demands sound and healthy teeth. Ulcerated roots and decayed teeth, an inflamed mouth and vitiated saliva, are poorly fitted to supply the stomach with food that can be properly digested and assimilated.

Abscesses with agonizing pains, necrosed jaws and probable disfigurement of the face, with tumors and foreign growths of varying character, frequently result from a neglected mouth.

Many other diseases, as of the eye, ear, and the cavities of the head, often the most difficult to diagnose, may be traced directly to an unhealthy condi-

tion of the teeth. But a short time ago, I was visited by a young lady whose eyes were so badly affected that she could see only with great difficulty. Medical treatment had failed to relieve her. Having trouble with her teeth, she found it necessary to consult the dentist; and with the curing of her dental troubles her eyesight was restored.

I have seen the most robust patients shattered in health by dental troubles. Who is not familiar with the acute suffering with which the development of an abscess, or swelling on the gums or face, is accompanied? The pain is not only agonizing, but the general health is affected. Surgeons and dentists are daily called upon to perform operations for the removal of the necrosed portions of bones, of tumors of the most formidable character, and sometimes even for the removal of the entire jaw. There is not a disease to which the human body is liable that is not aggravated by an unhealthy condition of the teeth.

It is marvelous to observe how men will spend money in the most extravagant manner for outward show, or will wear away the best part of their lives in the accumulation of wealth, and yet never give a thought or a penny to the preservation of health. But there will come a day when disease shall have so wasted their system as to place its recovery be-

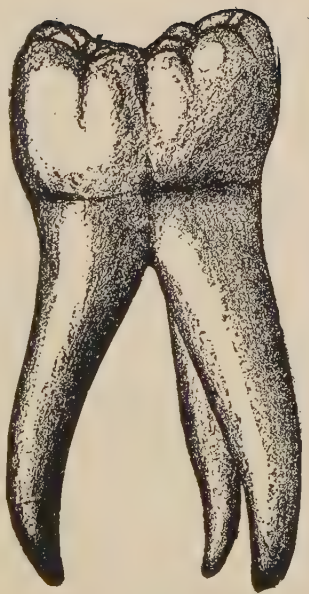
yond all medical skill, and then they will realize the full consequences of their neglect.

It is in the comprehension of these facts that I have written this book. In it I shall discuss the following topics:

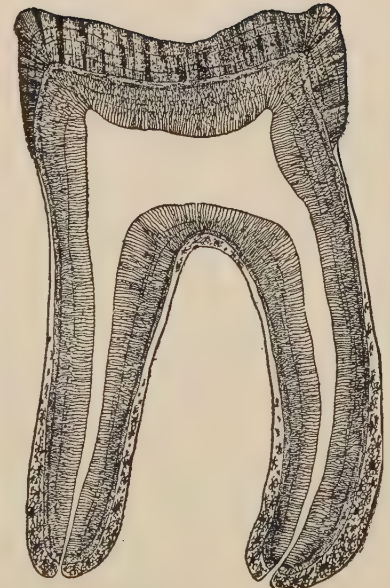
1. Cleanliness.
2. Filling the teeth.
3. Extraction of diseased teeth.
4. Artificial teeth.
5. Advice to mothers.
6. Children's teeth.
7. Crown and bridge work.
8. Fractured jaws.
9. Cleft palate.
10. Hints on home remedies.
11. Quackery.
12. The Necessity of School Instruction in Dental Hygiene.

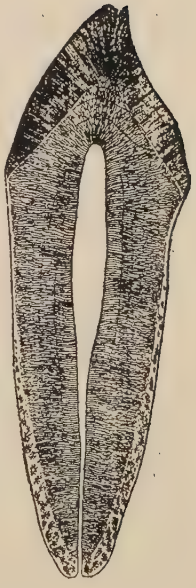
I have adopted this system of division because I think it not only the most logical, but that which is best calculated to give the reader a knowledge of the dangers incurred by neglect of the teeth and of the best remedial measures to be employed when suffering from such a course.

Before concluding this chapter, I may say that



Molar tooth, showing the cavity in which the nerves and blood vessels are located (or pulp).





Front tooth, showing cavity in which the nerves and blood vessels are located (or pulp).

the lack of knowledge displayed by the popular mind on these subjects has aroused in me the desire to place before my readers, in a concise form, such information as will be of service to them in all dental emergencies, and which, if carefully followed, will add to their health and strength and to their consequent happiness.

In preparing these pages, I have had primarily before me the fact that just such a book is needed, to throw some light upon a common subject that is not sufficiently considered in the ordinary courses of school instruction.

I have endeavored to avoid the use of technical terms, and to study simplicity in the language employed, as it is my sole intention to interest the popular mind with matters which are familiar to the medical and dental professions.

CHAPTER II.

CLEANLINESS.

THE importance of keeping the mouth free from remnants of food and masses of tartar cannot be too strongly impressed upon the reader. It is no exaggeration to say that ninety-five per cent. of all dental troubles are the direct outcome of uncleanliness. When particles of food are allowed to accumulate upon and between the teeth, fermentation, which will be subsequently explained, takes place, and decay is the result. Or putrefaction may ensue, and the mouth become a very center of disease and infection. If the mouth could be kept perfectly clean and pure, teeth would never decay, but as this is impossible, it only remains for us to clean the teeth thoroughly after each meal, that the particles of food may be as perfectly removed as is practicable.

TARTAR.—This is a deposit of animal and mineral matter, precipitated from the fluids of the mouth upon the teeth. Sometimes it accumulates in such

large quantities as completely to incrust them. It imparts to the teeth a greenish, yellowish, darkish, and sometimes a white color. Its effects upon the teeth are:

1. It makes the gums spongy and sloughy, and causes them to bleed at the slightest irritation.

2. It produces suppuration of the gums, and pus accumulates, sometimes in considerable quantities, making the mouth exceedingly unwholesome.

3. It forces the gums from the teeth, and working its way between them produces such an absorption of the bony sockets as to cause the latter either to fall out of their own account, or to be taken out at the least exhibition of any force.

4. It vitiates the saliva, and as this fluid is essential to digestion, the digestive apparatus is deranged and the entire system is disturbed.

5. It imparts a disagreeable odor to the breath. This is one of the most disgusting features of a filthy mouth, and makes the sufferer obnoxious to all.

If, then, one would preserve his teeth and avoid these diseases, he should keep them free from decaying food and tartar by the most unremitting attention. This cannot be done by merely polishing the exposed surfaces.

When once allowed to become incrusted with tartar, no one can thoroughly clean his own teeth,

because he can neither see where the masses are, nor can he use the proper instruments for their removal. The work can only be well done by the dentist. Everyone, then, should visit his dentist at least twice each year, for cleaning and examination of his teeth.

We often hear the question asked, if cleaning the teeth with instruments does not injure the enamel, or if they are not so irritated as to cause disease; and perhaps instances are cited in which the teeth of friends have, in their imagination, been led to decay because of the work done upon them by some dentist in cleaning.

It is undoubtedly true that, when teeth are cleaned, cavities of decay that were masked by tartar are uncovered; but in such instances the cause existed before professional aid was sought.

Neither the medicines nor the instruments employed by a good dentist will, in any case, injure the teeth. In the first place, no respectable practitioner would employ any remedies that could be harmful. In the next place, the instruments are of the finest make, while the enamel is too hard to be abraded by them. The pain complained of is caused by the removal of the tartar that has been allowed to accumulate beneath the gums, and which had forced them from the necks of the teeth, leaving

that portion bare and exposed. A few days will accustom them to the changed condition, when the irritation will subside.

The decay of which the patient complains was not caused but revealed by the cleaning. Sooner or later it would have manifested itself, as the coatings of filth and tartar had been silently doing their work of destruction, and the cleaning, far from inducing the decay, simply exposed its existence, and warned the patient to check its further progress.

After the teeth have been thoroughly cleaned by the dentist, to preserve them in this condition the patient should wash them with lukewarm water, and polish frequently with a powder or mouth-wash, using a soft brush.

Lukewarm water should be used, because it cleanses much more effectively than either that which is very cold or very warm, and because, even if the cold and warm water could clean as perfectly, they should still be avoided, as they act injuriously upon the teeth.

Every layman has no doubt observed for himself the physical law that heat expands, while cold contracts bodies. No one would think of removing a glass tumbler from a basin of very cold to very hot water, or *vice versa,* because he knows that the rapid expansion or contraction which would follow might

break the glass. It is in a similar manner that the enamel of the teeth may be cracked when very cold or very warm substances succeed each other in the mouth.

In choosing a brush, select a soft rather than a harsh one, as the latter irritates and abrades the gums. Brush from the gums toward the summits of the teeth, or longitudinally, and not transversely. By brushing across them, particles of food are forced between the teeth, where they may become centers of decay. After using the brush, wash it carefully, that all decomposable matter which may have been caught by the bristles may be removed.

In the absence of a brush, a silk thread is an excellent substitute. By forcing it between the teeth, all matter which may have lodged there is removed. Indeed, floss silk, prepared for this purpose, is an excellent thing with which to supplement the tooth brush.

Powders and mouth-washes, when free from acids, should be employed in cleaning the teeth. Great care and judgment should, however, be exercised in their selection. Indeed, the preference should decidedly be given to such as are prepared by experienced dentists themselves, by men whose intimate knowledge of the laws of dental science

qualifies them to put such articles before the public.

While there are undoubtedly many good preparations of this character, there are countless powders and washes which are worse than useless, because they are positively injurious to the teeth. Some of them, for example, contain acids which, it is true, clean the teeth very rapidly, while, at the same time, they surely cause their destruction.

The teeth are composed chiefly of mineral salts. Acids have a great affinity for these, and, when brought in contact with the teeth, corrode or dissolve them, in this way making their surfaces rough, and bringing about their ultimate destruction. Another fatal error committed by most manufacturers is that all their preparations are put up with a view to flatter the palate by sweetening. This, of course, makes the use of large quantities of sugar or similar ingredients necessary.

Sugar in the mouth very readily undergoes a chemical change and is converted into an acid. Again, from a sense of pure economy, the majority of tooth-powders are made of cheap, gritty, and coarse materials which abrade the enamel, and in this way frequently become the primary cause of the decay of the teeth.

It is my candid belief that the legislature should

enact a law rigidly requiring on the part of the manufacturers of dental preparations a thorough professional knowledge of the chemical composition of the teeth and of the laws which govern their preservation.

It is sufficient to use tooth-powder every other day, and preferably before retiring at night, when one has ample time to brush the teeth carefully. It is certainly extremely important to have the mouth thoroughly clean before going to sleep. At other times a brush and water will suffice. After the teeth have been carefully brushed, the mouth should be rinsed daily with an astringent mouth-wash or mouth-elixir.

Such washes should be composed of ingredients which will not only remove inflammatory conditions of the mouth, but also harden the gums, purify the breath, and at the same time act as a germicide.

Lime water should occasionally be used to overcome extreme acidity of the mouth. Its peculiar virtue lies in the fact that it is an alkali—that is, it neutralizes the effects of acids. Such acids may not only be contained in our food, but sometimes even in the saliva itself, the latter condition often existing when a person is in a state of debility.

Those who object to lime water because of its unpleasant taste, may remove this objectionable feature

by using with it a few drops of oil of rose or cologne water.

If the directions here given are carefully followed, a clean mouth, pure breath, firm gums, and sound teeth will be the result.

AN ANATOMICALLY CONSTRUCTED TOOTH BRUSH.

Throughout the world dentists are condemning the old style tooth brush as being faulty in construction, useless for the purpose it was intended, and largely instrumental in causing the decay of the teeth.

Observations have shown that this style of brush, with its straight handle and clumsy, bulky and awkward head, is so constructed that one is unconsciously compelled to brush the teeth from side to side, thereby forcing particles of food between the teeth, which eventually decompose and cause the decay of the teeth. The bulky head of this brush, when inserted into the mouth, distorts the tissues of the face and irritates the gums.

To be true to Nature one must follow her anatomical construction. The fibres in both the gums and the enamel of the teeth run vertically, and not transversely. Hence, when the teeth are brushed from side to side, or transversely, the result is similar to brushing a silk hat the wrong way.

To preserve the teeth and keep the mouth in a

thoroughly hygienic condition two things are essential: the correct brushing of the teeth, that is, upwards and downwards, and a thorough massaging of the gums. These things, however, cannot be done with any degree of comfort with the old style tooth brush.

It is not amiss here to say that there has been recently invented, a new, or, as it is called, a natural tooth brush, which fully complies with all the scientific requirements of modern dentistry.

In the opinion of the leading men of the profession, it is an ideal brush.

FEATURES OF THE NATURAL TOOTH BRUSH.

It is "T" shaped or rake-like in form and constructed on strictly anatomical lines.

It is especially designed for massaging the gums, and brushing the teeth in one way only, and that is upward and downward. In brushing the teeth upward and downward two difficulties are overcome. First, the particles of food are not forced between the teeth; second, the structural part of both the enamel and the gums are not disturbed.

The head of the new tooth brush strictly follows the contour of the arch of the mouth. All the sides taper towards the end, so that when the brush is put into the mouth it gently slides under the lips without disturbing or distorting them.

The head of this brush is so delicate and small that

with a little practice one can easily learn to brush the grinding and inside surfaces as well.

Each brush is composed of four rows of bristles, two upper rows, which are very soft, are intended for massaging the gums; and two lower rows, of a harder texture, intended for brushing the teeth.

This new brush will materially assist in overcoming Pyorrhœa, or Rigg's Disease. It is really an ANTI-PYORRHŒA AND ANTI-CARIES BRUSH.

PYORRHŒA, OR RIGG'S DISEASE.

A great majority of people are troubled with Rigg's Disease, or bleeding and receding gums, loose teeth, foul breath, accumulation of tartar, etc. The gums, like the muscles of the body, need exercise, and there is no better remedy to prevent and overcome Rigg's Disease than by massaging the gums.

No matter how anyone's gums may bleed, if they are massaged a few times daily for three weeks with this brush and a proper kind of astringent preparation, the gums will become hard and firm, attach themselves to the necks of the teeth, and indirectly tighten the latter.

Daily massaging of the gums will also produce a healthy circulation of the blood, dislodge the incipient deposits of tartar from the necks of the teeth, strengthen the gums and render them less liable to disease.

CHAPTER III.

FILLING THE TEETH.

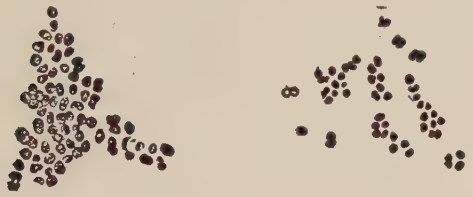
JUDGING from the questions constantly asked the dentist, it is no exaggeration to say that very few people have a clear conception of the causes which lead to decay of the teeth.

Experiments and observation have shown that these are numerous. Chief among them is the fermentation of particles of food lodged between the teeth, or in their pits or depressions, during mastication. When, through carelessness or indifference, these deposits are not removed, under the influence of the warmth, moisture, and the microbes present, fermentation or chemical change takes place and an acid is generated; and this dissolves the enamel and dentine, leaving a cavity, which constantly grows larger and deeper.

The dentine is of a tubular structure, and into these tubules the microbes which constantly exist in the mouth penetrate, where they continue their destructive effect until the tooth is completely destroyed.

Microbes are minute vegetable organisms, some of the many species of which are so small that they are only visible under the highest powers of the microscope. They are the cause of a large class of infectious or contagious diseases, and between them and the body there is a constant struggle.

The process of fermentation is of itself but the



Microbes, micro-organisms or bacteria, greatly enlarged.

growth and multiplication of these minute organisms, and in this process of their life-history they produce the acids and other poisonous material which make them so fatal to mankind. Their number is inconceivable.

These are the direct causes of decay of the teeth. But there also exist indirect, or contributing causes; and these may be anything which will lower the general tone of the system and make it less able to resist the action of deleterious agents.

Among these secondary causes producing decay may be mentioned any protracted sickness, the lack

of outdoor exercise, excessive study, anxiety, or worry, which undermine and weaken the system. When the body is ill, no one organ can be said to be perfectly sound.

The teeth may be crowded or depressed, or there may be fissures which offer a ready means for lodgment of food. The walls of the teeth may not be

Other forms of microbes, greatly enlarged.

dense, and their power of resisting decay may be very weak; or the food may not contain the necessary elements for nourishing the teeth, and hence the work of repairing the wear and tear of daily use may be but poorly accomplished.

Again, there may be a hereditary tendency to decay. That our ancestors suffered from any special ailment does not necessarily demonstrate that it will be reproduced in us, but it is probable that the same debilitating conditions will be inherited. Their consequences can, however, be avoided by proper and unremitting care. These causes are constantly at work, producing decay of the teeth and forming

minute cavities, through which the decay rapidly progresses until the living matter of the tooth is reached. Unless this is checked, the tooth will be totally wrecked; even if it be not wholly destroyed, it will be so badly decayed that it will threaten the welfare of the entire dentition, and therefore it may become necessary to extract it.

Many, fearing that the filling of a tooth will be painful, refuse to have this done. But when the proper manipulation is employed, the operation is accompanied by very little acute pain, and if the decay is of recent formation, by none at all. Every consideration, then, whether the ultimate welfare of the tooth is concerned or the desire be to avoid suffering and discomfort, prompts the patient to early attention to his teeth before decay shall have proceeded so far as to cause toothache.

The teeth are composed of four principal parts—Enamel, Dentine, Cementum, and Pulp.

Enamel.—This constitutes the cap, outer covering, or occluding surface of the tooth. It is the hardest tissue in the animal body. Its great density admirably adapts it to the purposes of mastication of hard substances. The enamel is easily distinguishable from the dentine with the naked eye, by its clear, lustrous, and somewhat translucent appearance.

DENTINE.—The dentine forms the principal constituent of the tooth. It is situated under the enamel, and is permeated by a great number of minute canals, which connect with the pulp chamber. It is a hard, elastic substance, with a yellowish tinge, and is slightly translucent.

CEMENTUM.—This forms a thin covering for the surface of the fang, or root of the tooth, and extends from its neck to the apex.

PULP.—The pulp is a soft tissue, occupying the pulp chamber, which is an elongated canal, wide at the crown, and narrow at the root. It runs longitudinally through the center of the dentine. The pulp contains the nerves and blood vessels of the tooth. It is the vital part, and sends forth minute fibers of living matter through the microscopic canals of the dentine, to nourish and endow the tooth with sensation.

As soon as the enamel is decayed through, the sensitive dentine rapidly disappears under the action of the acids produced by fermentation, and the pulp soon becomes exposed.

Frequently the decay of the sixteenth part of an inch is sufficient to lay bare the pulp. This is extremely sensitive, and the contact of any foreign matter causes the most exquisite suffering. The least change of temperature, or the exertion of any

undue pressure upon it, will so irritate its nerve filaments as to produce severe toothache, and affect the entire nervous system of the head.

Before the pulp has become exposed, the operation of filling the teeth is comparatively painless. The filling lasts, and the tooth remains strong, because the vital portions of the pulp have not been affected.

It is easy to discover when the dentine alone is exposed. This may be sensitive to the touch, to cold and to heat, but the pain is dull, and passes away when the irritating agent is removed. When, however, the pulp is exposed, the pain is acute, constant, severe, and agonizing. Thus the degree and character of the pain will indicate the amount of the decay. Should the tooth be neglected when the pulp has become exposed, inflammation sets in, and the work of filling the teeth is very painful, and perhaps impossible, and if the neglect be persisted in, the pulp dies.

Thus at the outset the dentist is confronted with three classes of diseased teeth—those in which the dentine alone is affected, those in which the pulp has been but recently exposed, and those in which, because of prolonged exposure, the pulp is either dead or dying. Of the first class I have already spoken. In a tooth of the second class, the pulp

can be cured by the application of soothing medicines, which may remove the irritation and subdue the inflammation, and enable it to bear a filling. If, after being thus treated, the tooth be filled, a covering of secondary dentine may be formed by nature underneath the filling, for the better protection of the pulp; and soon the tooth may become as sound as ever.

Concerning the third class of decayed teeth, there are three kinds. Those in which the pulp has recently died, those in which there is more or less of infection and inflammation, and those with a fistulous opening, with a more or less constant discharge of pus. The first can be cured with comparative ease. The second may be relieved if judicious means are employed, while the third may require a considerable time, and the exercise of much patience and skill on the part of the dentist. The pulp chamber and canals must be thoroughly cleaned and disinfected, and this work is sometimes performed with great difficulty, as the canals are often crooked and difficult of access.

Should the dentist fill such a tooth, leaving within it particles of infected matter in the pulp canal, they may putrefy and generate gases, which, having no escape except through the opening at the apex of the tooth, press against the surrounding tissues,

and produce abscesses and swellings, with their accompanying pains. After the whole territory has been thoroughly disinfected, the canals must be effectually filled. It is sometimes advisable to in-

Different forms of microbes, very much enlarged.

sert a temporary filling to last for several weeks, and only after this experimental stopping has been sufficiently tried, and no unfavorable symptoms have supervened, should a permanent filling be substituted for the temporary one. If, however, the tooth becomes sore, it is an indication that inflammation is again active, and that unless it be reduced an abscess may follow. The filling must then be removed, and the tedious work of disinfection resumed.

It is apparent, then, that to postpone the work of filling a decayed tooth only increases the danger

and suffering, while the result, when accomplished, is much less satisfactory.

There are some dentists who promptly apply an arsenical paste to sensitive cavities, whether the pulp be exposed or not; and patients have been led to approve this, thinking thereby to avoid pain during the filling. But it is very bad practice, and the more reputable portion of American dentists condemn it earnestly, and for some of the following reasons:

First, because when devitalized, there is always the liability to putrefaction and the formation of an abscess.

Second, because it is much easier to fill a live tooth than a dead one.

Third, because a dead tooth is liable to many diseases, and is not as permanent or as useful as a live one.

To destroy the pulp quickly, arsenic is employed. Unless this be carefully and skilfully used, there may be intense pain. The cavity must be carefully and delicately cleaned of all foreign material, the irritability of the pulp must be allayed, and then the proper devitalizing agent must be so inserted that no pressure will be exerted. When this is skilfully done no pain will ensue. But it is much better if the pulp can be saved alive, and the honest

dentist will therefore put forth every exertion to do this.

A few words as to the materials to be used in filling the teeth. Gold and tin possess all the requisite qualities for beautiful and lasting fillings. Silver is only used in the form of an amalgam, with mercury. Gutta percha and cement form excellent temporary fillings for teeth so decayed that they cannot stand the strain incident to the filling with gold or tin foils. The choice of materials should, however, be left to the dentist, as he best knows the peculiar conditions, and what they demand.

CHAPTER IV.

EXTRACTION OF DISEASED TEETH.

EXTRACTION is an ultimate remedy, and should be resorted to in extreme cases only. If people would give to their teeth the attention that is their due, there would be no occasion for the forceps, except in very rare and exceptional instances. It is because of ignorance, or inexcusable carelessness, or the unconquerable dread of dental operations, that the necessity for the removal of teeth arises. Timely care might preserve even those which are naturally weak and bad.

But, through neglect, cases arise which imperatively demand extraction. Let us consider some of the consequences of a refusal to have this done.

The most common of these are abscesses.

Abscesses, or gumboils, are collections of pus or putrid matter, due to infection and inflammation of the tissues surrounding the roots of diseased teeth. These may produce many dangerous results, among which are those that follow:

LOCKED JAW.—Sometimes a severe abscess is

caused by diseased molars or wisdom teeth of the lower jaw. The nerves become so irritated that they are finally paralyzed, and the muscles remain in a contracted condition. They cannot perform their office, and the sufferer is unable to open or close his mouth. When this happens, the patient is said to suffer from locked jaw. It should be understood that by this term is not meant tetanus, or spasmodic contractions.

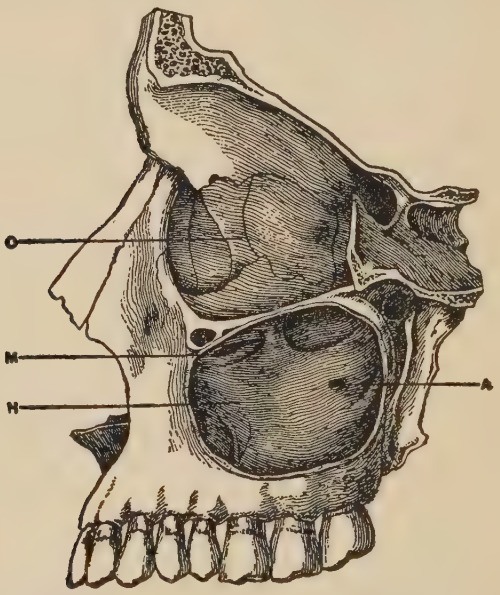
Neuralgia.—Intense neuralgia of the eye, the ear, or the entire side of the face, is frequently produced by the pressure of an abscess and the irritation due to a diseased tooth. All the nerves which supply the eye, the ear, the face, and the teeth are intimately connected through their terminal filaments, and any special irritation of one may be communicated to and affect any of the others.

The oculist and aurist recognize that the eye and ear may be affected by diseased teeth, and so, very often, before proceeding with their work, insist that the patient have his teeth put in good condition.

Necrosis.—Death of the bone frequently results from an abscess. When pus is allowed to accumulate in large quantities, it may burrow between the bone and the periosteum, or membrane which envelops the bone, and which gives to it nutrition and vitality. This membrane being severed from

the bone, the latter dies from lack of nutrition, and from the violent inflammation caused by the abscess.

EYE, EAR AND NOSE.—These organs are very



Left Upper Jaw, showing cavity into which the roots of the first or second molar frequently penetrate, and are a source of trouble when diseased.

often affected by diseased teeth. Over the molars, in each side of the upper jaw bone, there exists a cavity, the roof of which is formed by the floor of the orbit, its inner boundary being the wall of the nose, and through which there is an opening into

the nostril. The floor of this cavity is formed by that portion of the jaw bone which holds the roots of the molars, and into which one of them occasionally penetrates. The walls of the cavity are thin, and are lined by a very sensitive membrane. Any serious disease of these penetrating molars, such as inflammation and suppuration, may extend into this cavity. Pus may accumulate in such large quantities that it will ooze out through the opening that communicates with the nose.

Thus may be seen why, when one suffers from a constant discharge from the nose, it may be due to a neglected tooth. Again, if the accumulation of pus is very large, it may press against the floor of the eye-ball, and either displace the eye or cause partial or complete blindness, or it may break through the bone and discharge upon the face, leaving an ugly scar. At the very least, the continued discharge, even though it may not find its way to the surface, makes the patient a constant source of offense, both to himself and those who surround him.

Cases are reported in which tumors caused by diseased teeth have developed to such enormous size that they plugged up the nose, dislodged the eye, and even broke down the wall of the cavity and penetrated into the brain.

Again, whenever a decayed tooth is in close proximity to a sound one, the latter will ultimately be affected, for wherever there is decay, there we find acids and microbes, which in their action are very destructive to the teeth.

Every day that these teeth are permitted to remain in the mouth but aggravates the condition, and renders their inevitable fate, extraction, more and more difficult. This is particularly the case with regard to the molars, which, as a rule, have several roots, all connected by the crown. When decay has destroyed the crown, the roots become separated, and must be extracted singly. Sometimes the patient attributes this difficulty to lack of skill on the part of the dentist, and perhaps even institutes legal proceedings for malpractice against men of acknowledged skill. These suits, though almost invariably unsuccessful, have in many cases blighted the reputation of the practitioner, for suspicion easily attaches to professional men, and clings to them with fatal tenacity.

We may thus see the importance of an early extraction of such badly decayed teeth. But many people shrink from the operation, either by reason of their ignorance, or because of the misrepresentations of their friends, or through a fear of the pain. Let me illustrate a case of very frequent occurrence.

"A" is suffering from an abscess developed from irritation produced by a dead tooth. He is about to visit the dentist to have the tooth extracted, when some officious, though well-meaning, friend informs him that it is dangerous to extract the tooth before the abscess has broken, and "A" will suffer many days and nights of intense agony, waiting for the abscess to heal, and after this has taken place and he no longer suffers torture, he undergoes the additional pain of having the tooth extracted. As a matter of fact, there is no danger in extracting a tooth about which an abscess is developing. There was a time when it was thought hazardous to do so, it is true, but this theory has long since been exploded. Moreover, the pain of extracting such a tooth is entirely lost in the far greater pain suffered from the abscess, for when one suffers from pains of varying intensity, the sensation of the lesser pain is, o a greater or less extent, lost in that of the greater.

There are many who fear to have a tooth removed because of the accompanying suffering. In reality, there is little pain in the extraction of a tooth. The sleeplessness, anxiety, and lack of proper food which precede the extraction, weaken the body, and hence the nerves are very susceptible to irritation. The pain of extraction principally results from these causes, and not from the extraction itself. Fortu-

nately for the sufferer, however, by the use of nitrous oxide gas, the extraction of teeth may be made absolutely painless.

This gas is obtained by heating a substance technically called ammonium-nitrate in a retort. This salt is composed of hydrogen, nitrogen and oxygen. The last two gases are the chief constituents of the air we breathe, and in differing proportions compose nitrous oxide gas.

Though odorless and colorless, the gas is sweet to the taste; through its action upon the nerves there is an entire loss of consciousness, and with that of course all sensation and volition. This lasts but a few moments. There is naturally considerable shrinking from it on the part of those who are

Teeth Grown Together.

unacquainted with its character. But statistics, carefully collected, show that it is by far the safest of the anæsthetics, and when properly administered,

that there is less risk from it than from the operation itself. It is given daily by many who possess no special medical knowledge, and who take no precautions as to examination before administering it. Yet rarely has any harm resulted, even though patients were suffering from diseases which are of themselves dangerous.

Let the patient take the gas on an empty stomach, and be perfectly calm; then its inhalation will be safe, and it will relieve the dreaded extraction of all its horrors.

In conclusion, let me add that if people have badly decayed teeth or roots that do not ache, they should at once be put in a sanitary condition. If this cannot be done, they should be extracted, for if allowed to remain they may bring in their train any one of a long list of diseases.

With the badly decayed teeth removed, and the remaining ones cleaned, filled, capped or crowned, as the case may demand, the mouth will be in a thoroughly healthy condition, and if any reasonable degree of care be bestowed upon it, will probably remain so for many years.

CHAPTER V.

ARTIFICIAL TEETH.

TEETH are subservient to three great functions—beauty, speech, and digestion.

BEAUTY.—From the remotest ages, the poet and the novelist have found in the teeth a fruitful theme for song. How they revel in painting their charms! No face, however rich in beauty, color, or regularity of its features, is a finished conception with an incomplete denture. Nay, if the denture be imperfect in the front of the mouth, the charms of the face but heighten the inharmony into repellent incongruity.

We are all ambitious to please, by conforming to the laws of the beautiful. In society, one who understands the laws of harmony delights the eye by her tasty attire. Another, though more richly dressed, having failed to harmonize her costume, attracts attention only by the impression of absurdity.

In the purchase of any article of clothing, we all

recognize that something besides the mere fit or adaptation must be observed. However excellent the material or the workmanship, a certain law of harmony must be observed, or the wearer will appear ludicrous.

I make but a mild statement, then, when I say that it is extremely unpleasant to behold a pair of ripe, cherry lips open but to disclose an incomplete denture. The contrast with what was expected becomes very jarring.

SPEECH.—Teeth are necessary, not only to beauty, but to speech. When any of them are missing, the power of speech is more or less impaired, because they are necessary to the proper formation of articulate sounds, and unless all of the teeth are present in the mouth, the result is an incomplete and discordant utterance. There is a certain relation between the physical form and the voice, from which we infer in advance the character of the tones which may be expected from any individual, and if instead of the expected basso a falsetto greets us, the result is very unpleasant. Speakers and singers recognize this fact so well, that the instant the denture becomes incomplete they have it repaired.

DIGESTION.—The most important function of the teeth is to assist in digestion, by masticating

and insalivating the food. Mastication is the process of reducing the food to a pasty condition, by grinding it into small particles and mixing it with saliva.

If before passing the food into the stomach this work of mastication is thoroughly performed, the

An Artificial Lower Denture.

food is rendered easily susceptible to the action of the fluid secreted by the stomach—the gastric juice. This reduces the food to a liquid state, and so prepares it for absorption into the system. When, however, the food is swallowed without being thoroughly masticated—that is, in mass, or in a dry condition—the action of the gastric juice is very slow, and to a considerable extent ineffective. It moreover fails to yield all the nourishing essence of which it is possessed, and causes in addition those intense agonies of indigestion, which a celebrated

writer once so forcibly described as "a hundred rats gnawing in the stomach."

Good health requires good digestion, and good digestion requires good mastication; but so long as any of the teeth are missing this is impossible, for nature, economical in all things, teaches that unless all the teeth were necessary, some of them would not be found in the mouth.

As the functions of the teeth are of such paramount importance, it is necessary that they be kept in constant repair, and if any of them are missing they should be immediately replaced. The modern dentist has reduced this art to a science, and artistically constructs artificial dentures, crowns and bridges.

ARTIFICIAL TEETH OR DENTURES.—There are two parts in a set of artificial teeth—the plate and the teeth.

An Artificial Upper Denture.

THE PLATE.—This is a thin sheet of rubber or metal, corresponding in shape to the hard palate or roof of the mouth. The rubber base is in most common use, as it is cheap and serviceable. Rubber is the coagulated milky juice of certain trees that grow in South America and other warm countries. After

undergoing many chemical changes, this is manufactured into rubber of various grades. Only the best is used by the reputable dentist, after it has been subjected to many delicate manipulations and processes.

Among some of the metals used in the manufacture of dental bases are gold, silver, platinum and aluminum. These are the precious metals, and only such are fit for use in dentistry.

TEETH.—The teeth are attached to the plate so as to correspond exactly to the natural denture, in size, shape, and order of arrangement. They are manufactured from porcelain, which is a compound of silex, feldspar and kaolin.

Silex is a white mineral, found in sands, rocks, crystals and flint.

Feldspar is generally found as an ingredient of granite and other volcanic rocks.

Kaolin is a fine clay, found in many parts of the world.

From these minerals, together with the use of coloring matter, artificial teeth are manufactured.

From various fancies or prejudices, none of which have any foundation in fact, many people object to the use of any artificial appliance in the mouth. Some, because they are ashamed to wear artificial

teeth, or because they are under the impression that they taint the breath, and destroy the sense of taste. Others, because they believe that artificial teeth are taken from the dead, or that an artificial denture cannot be held securely in the mouth.

No false sentiment should be allowed to interfere with the laws of health or proper hygiene. Beauty, speech and mastication are primary considerations, and no mere affectation has the right to negative their demands.

Artificial teeth neither destroy the sense of taste nor contaminate the breath. The sense of taste is located in the tongue, and there is not a single ingredient entering into the composition of the rubber or teeth which can infect the breath. Nor are artificial teeth ever taken from the dead. Their very name shows that they are the product of man's handiwork; they are manufactured from the pure materials that I have already enumerated.

To those who fear that a denture cannot be held firmly in the mouth, let me say that their apprehensions are groundless. To secure the plate in the mouth it is necessary to utilize two forces of nature —adhesion and atmospheric pressure.

Adhesion.—Adhesion is that force by virtue of which the molecules of different bodies cling together. A remarkable instance of this is found

when we press together two smooth or occluding surfaces. Adhesion is so strong that they will cling together with great tenacity. If we press together two perfectly level surfaces of glass, it will be found very difficult to separate them.

Atmospheric Pressure.—The air presses in every direction with a force of about 15 pounds to the square inch. A little computation demonstrates that the human body, for instance, is subjected to a constant pressure of from 20,000 to 30,000 pounds. This would be sufficient to crush us to the earth, were it not that the air presses equally in all directions. Hence the downward pressure is counterbalanced by an equal upward pressure. This may be proven by an actual experiment.

Take a glass jar, the mouth of which is accurately fitted to a smooth metal surface, and by means of an air pump exhaust the air within it. Now try to lift the jar, and it will be found that it adheres with great tenacity. There is no air within to counteract the downward pressure of that without. But if the air be allowed to re-enter the jar, it can be raised as easily as ever.

Children playing with the familiar leather soakers, unconsciously take advantage of adhesion and atmospheric pressure. When the soaker is pressed down upon the stone, the air is forced out, and

they are enabled to lift the stone, whirl it in the air, or carry it about.

Artificial plates are constructed upon a model taken from an impression of the mouth, and they are thus made accurately to fit the hard palate and gums. There are two perfectly occluding surfaces, the palate and the plate. When these are brought into contact the air is driven from between them, and adhesion and atmospheric pressure are called into play. Hence the plate is held in the mouth by the action of natural forces, and the patient need not worry himself by conjuring up imaginary difficulties.

CHAPTER VI.

ADVICE TO MOTHERS.

WERE one to say to the mother, as she lovingly fondles her young, "ninety per cent. of the diseases from which your child will suffer in after life are directly traceable to your treatment of it," would she not deny the assertion with unbounded indignation? And yet, the charge is true, for it must be apparent, even to a superficial observer, that women, as a rule, possess such an imperfect knowledge of the laws of hygiene as to be but poorly equipped for a thorough training of their young.

There was a time when diseases were regarded as the manifestations of the wrath of an offended Deity, who could only be appeased by offering up sacrifices on the altars of the Gods, and as men thought it hopeless to struggle against the Deity, they paid little, if any, attention to the laws of hygiene. Those times, however, have passed. Our higher culture has swept away these idle superstitions, and has revealed to us the universal reign of

inexorable laws. This should teach us that health is the reward of obedience to these laws; disease the penalty of their infraction. They are easily ascertainable, and readily followed. Indeed, such progress has been made in their systemization and comprehension, that we can almost choose between health and disease; but to secure the full measure of advantage which must result from an adherence to these laws, their study should not be postponed to mature life. It must begin in early infancy, and be made to form part of the home and school training, for knowledge and impressions received in childhood are the most lasting, and are readily developed into fixed habits.

The training of the child during this early period of its life is peculiarly the work of the mother, and not all the study and thought of after life can thoroughly eradicate the ideas and habits which she can impress upon its young mind. To perform the work of education efficiently, the mother must be as familiar with the laws of the child's physical existence as she is with the laws of its moral well being.

Yet, while we realize that without an intimate acquaintance with the principles of good health immunity from disease is impossible, we have made no united effort to instruct our women so that they can perform this duty. Nay, if some woman, more

intelligent and enterprising than the rest of her sex, makes a thorough study of hygiene and of kindred topics, she too often becomes a subject for ridicule among her acquaintances. They seem to think, as did women of yore, that the circle of woman's attainments is bounded by the horizon of man's pleasures, and that if she has acquired a knowledge of dancing, singing, music, courtly manners, and a little understanding of household management, she is equipped for the duties of life, of marriage, and of maternity. To dispel this delusion, and awaken in women a sincere desire to familiarize themselves with the laws of health, which is the object of my present chapter, is, therefore, of the utmost importance. The evils which result from disobedience of these laws are not confined to women alone, but are transmitted to their offspring, and in this way are perpetuated. Truly, "the evil which men do, lives after them." How forcibly did Henry Ward Beecher realize this, when, in answer to the question, "When should a child's education begin?" he said, "With its grandfather." It is my province, however, only to consider those hygienic laws which are intimately connected with the welfare of the teeth. A discussion of the remaining principles is not the office of the dentist, but of the general physician.

For the sake of clearness and logical arrangement, I shall divide this chapter into two topics:

First, "What to Eat."
Second, "How to Eat."

What to Eat.

Lack of cleanliness and of proper dieting are undoubtedly the main causes which contribute to the destruction of the teeth. As the subject of cleanliness has already been discussed at length, I shall now proceed to consider the subject of proper diet, by which I mean not only what to eat, but also how to eat.

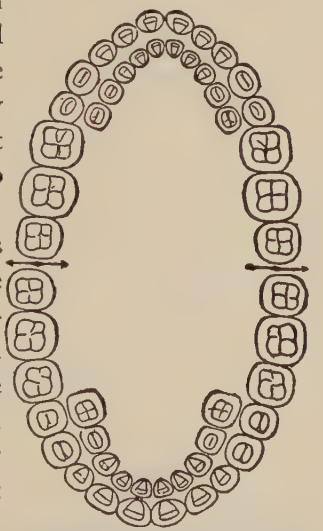


Diagram showing relative positions of temporary and permanent teeth, in both upper and lower jaws (inner row, temporary teeth; outer row, permanent teeth).

What to Eat.—This is a question that must be solved differently for different individuals. The food which is proper for one man may not agree with another. The student, or the brain worker, could not long subsist on that required by the laborer, or the out-door toiler. Time, age

and occupation must all be considered before it may be said to any man, " Eat this or that kind of food." Yet, in spite of this difficulty, there are certain foods of which it may be said that they are safe to all.

The human body is composed of seventeen elements, the chief of which are hydrogen, nitrogen, carbon, and the salts of lime. The various organs of the body are formed by varying combinations of a certain number of these elements, and these organs sustain and nourish themselves by extracting from the blood a sufficient quantity of the elements which enter into their formation, so that if the food is deficient in any one element, some one organ of the body is destined to suffer. As no foods, except milk and eggs, contain all the elements which enter into the structure of the body, it is apparent that to properly nourish all our organs, recourse must be had to a diversified diet. In this way the abundance of a certain element in one food may supply its deficiency in another.

Teeth strongly resemble bone in their composition. They are composed of animal and mineral elements. The mineral matter is the more abundant of the two, and consists principally of lime salts, such as phosphate of lime, carbonate of lime, fluoride of calcium, and phosphate of magnesia. These elements give to the teeth their strength and

hardness. If they are absent to any marked extent, the teeth are weak, frail and soft.

By careful experiment, it has been found that the following foods contain these elements in greatest abundance:

MILK.—This is the representative food, as it contains every element which enters into the structure of the body; but as it is a ready absorbent of microbes, it should be boiled before it is given to children. The boiling kills the microbes.

BUTTERMILK.—This is valuable as a food, except when it is churned from very sour milk, or has become cheesy by age.

CHEESE.—This should be eaten sparingly, as it is indigestible; a little, however, may aid digestion.

THE CEREALS.—Wheat, maize, rye, oats and rice are very valuable foods, because they contain so many of the constituents needed for life and health.

Fine flour, however, should be sparingly used, because in its preparation the lime salts and phosphates are extracted. Thus, it has been estimated that five hundred pounds of Graham flour contain seventy-five pounds of muscle, and eighty-five pounds of bone material, while an equal quantity of white flour contains only sixty-five pounds of muscle, and but fifty pounds of bone material.

Eggs.—These are highly nourishing. They should be used "soft-boiled," and not hard-boiled, as the latter are less digestible. Eggs should always be eaten with a little bread and salt, as this renders them more wholesome.

Meats.—Of all meats, beef and mutton are the best regular foods. If rightly prepared, meat is very nourishing and digestible. Among other nourishing meats might be mentioned pork, veal and poultry. Meat, however, should not be eaten excessively, and should never be used unless carefully prepared.

Fish.—When fresh and well cooked, fish are very nourishing.

Beans.—The nutritive value of beans is higher than that of any other vegetable. Among the most valuable varieties may be mentioned the kidney, the haricot and the lima.

Peas.—Peas have qualities similar to beans, but not in the same degree.

Potatoes.—If properly cooked, these make a valuable food. When cold they are indigestible. They are best when boiled with the skin on, or when roasted. Potatoes contain valuable potash salts, which are lost in boiling without the skins, but are retained in baking and stewing.

Vegetables.—Cabbage, parsnips, carrots, onions,

tomatoes and beets are good foods when eaten moderately, but if taken in large quantities are indigestible.

These are but a few of the many valuable foods which a bountiful nature has placed at man's disposal. Only those are enumerated in the above list which are important from the standpoint of the teeth. They are equally valuable, however, in building up the rest of the body. For a more extended discussion of food, I refer the reader to some work on hygiene. In our libraries may be found many books treating of this topic most exhaustively and explicitly. Their perusal will repay the reader with compound interest.

The consequences which result from a neglect to use proper food cannot be overstated. It is because of this neglect that so many of our boys and girls, while yet in the full bloom of youth, are compelled to wear artificial dentures. One eminent writer has even said, "We are becoming a toothless people." Of course he did not imply that our ancestors did not suffer from decayed teeth. They certainly did, but through an examination of their remains, we must conclude that they did not suffer from dental troubles to the extent that we do.

Our inventions and discoveries have revolution-

ized science and art. They have even changed the character of our food. The tables of the rich are to-day loaded with delicate, dainty viands, from which have been extracted the phosphates and lime salts, the elements that build up the bones and the teeth. It is because he eats such food that the child of riches often has weak, ill-formed teeth, and because the child of poverty subsists on coarse flour, he enjoys a wealth of teeth that money cannot buy.

Having now learned "What to eat," we have yet to learn what few, indeed, understand, "How to eat," for the evils resulting from a neglect of the latter will more than balance the good derived from an observance of the former.

How to Eat.—However nourishing may be the food one eats, it can yield little benefit unless it is properly eaten.

1. It is to be thoroughly masticated.

2. It should not be taken in excess, nor the maxim forgotten, "We eat to live, and do not live to eat."

3. It is not to be taken too hot or too cold.

4. The stomach must be allowed freedom of movement.

It is self-evident that if the stomach is overloaded

by excessive eating, or if the food is bolted and not thoroughly masticated, the work of digestion will be poorly performed, the stomach become disordered, and the saliva acidified. The acid saliva, as already shown, destroys the teeth.

It is equally evident that since the food digests most readily at a temperature of about 98° F., if that which is very cold or warm is taken into the stomach, its temperature is materially lowered or raised, and to that extent the work of digestion is checked.

Nor need I add that if the free movement of the stomach is restrained by stays or tight corsets, it cannot perform its functions properly. No doubt a slender waist gives to a woman an elegant form, but a gracefulness purchased at the price of health is a charm far too costly.

The importance of avoiding the use of liquor and tobacco, in any form, should also be constantly impressed upon the minds of children. That liquor and tobacco are very injurious in their action upon the heart, lungs, nerves, stomach, teeth, and the other organs of the body, is the opinion of all physicians; yet mothers as a rule make no strong effort to arouse their children to the danger of their use. Tobacco, moreover, befouls the breath, stains and discolors the teeth, and thus makes them unsightly and repulsive.

Effects of Diseased Teeth.

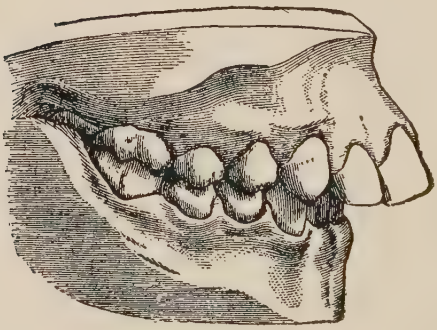
Excision of the upper jaw.—Weber's incision. (After Weber.)

As I can only treat of the laws of health in so far as they directly affect the teeth, I must stop here, for a more extended discussion would take me from the field of the dentist into the domain of the physician. Let me close, therefore, by recapitulating the various points suggested in this chapter.

1. Let the mouth be always clean.
2. Masticate the food thoroughly.
3. Eat moderately; avoid excess.
4. We eat to live; we do not live to eat.
5. Eat substantial, well-cooked food.
6. Avoid pastry and superfine flour.
7. Do not eat very cold or very warm food.
8. Do not restrict the action of the stomach by corsets or stays.
9. To neutralize the acidity of the mouth use lime water; taken in moderate doses, internally, it is very efficient in hardening the teeth; it may also be used as a mouth wash after each meal.
10. Lactophosphate of lime may be used in those cases in which the food is deficient in lime salts; it assists in retaining food on the stomach. It strengthens the mother's teeth and contributes to the better development of those of her children. It should be taken in teaspoonful doses three times daily.

A solution of bicarbonate of soda makes another excellent mouth wash. Use a teaspoonful in a glass of water after each meal; like lime water, it is excellent in neutralizing the acidity of the mouth.

11. Avoid the use of either liquor or tobacco.



A case of irregularity of the teeth.

CHAPTER VII.

CHILDREN'S TEETH.

By a natural progression we are brought to the consideration of children's teeth. After the mother has secured to her child a solid foundation, her work has but begun. As soon as the teeth appear they must be carefully watched, for as they take some time to solidify, they easily decay. As to the best means of preserving these organs, there is much misunderstanding and lack of knowledge, and hence many a child's teeth are unwittingly permitted to decay. The following suggestions on the care of infants' teeth will, therefore, I think, be of some service to the reader.

Children grow two sets of teeth. The milk teeth, twenty in number, and the permanent ones, thirty-two in number.

The milk teeth generally appear as follows:

Central incisor, ...	5th to 6th month.
Lateral incisor, ...	7th to 8th month.

First molars, ...	12th to 16th month.
Canines, ...	14th to 20th month.
Second molars, . . .	21st to 36th month.

The eruption of the lower teeth usually takes place before that of the upper.

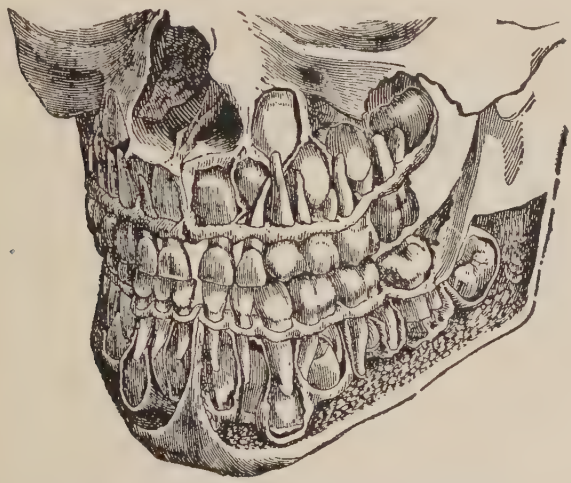
The permanent teeth appear in the following order:

First molars, ...	5th to 6th year.
Central incisors, lower jaw, .	6th to 7th year.
Central incisors, upper jaw, .	7th to 8th year.
Lateral incisors, ...	7th to 9th year.
First bicuspids, ...	9th to 10th year.
Second bicuspids, ...	10th to 11th year.
Canines, ...	11th to 13th year.
Second molars, ...	12th to 15th year.
Third molars, or wisdom teeth,	18th to 23d year.

As the milk teeth last but a short time, or until they are displaced by the permanent teeth, very little attention is generally paid to their preservation. Tartar and filth are allowed to accumulate, and as soon as they become troublesome they are extracted.

The idea that the milk or deciduous teeth should be taken out as soon as they ache, is not only erroneous but harmful. So long as they can be

saved, they should not be removed, as serious injury is inflicted on the child. If these are extracted the incoming permanent ones are seriously interfered with; they grow out of their allotted space, or grow in an irregular manner, distort the



Illustrates the jaws of a child between six and seven years of age, showing the relations of the two sets of teeth.

mouth and impede the work of mastication. Nature indicates the time for their removal by absorbing their roots and loosening their crowns, preparatory to the appearance of the permanent teeth. Moreover, it is somewhat dangerous to extract any of the milk teeth, because the jaw is not yet per-

fectly developed, and is, therefore, very frail and liable to fracture. It is because of this belief and the consequent neglect that the milk teeth decay so rapidly. As soon as they appear, they should be cleaned every day with soft linen, and when all the teeth are erupted, a soft brush should be used. Tartar, easily distinguishable by the dark or green stain which it imparts, should not be permitted to accumulate.

From the tables already given, it appears that at the age of six the child has four, and at the age of twelve it has twenty-eight of the permanent teeth.

The sixth-year molars deserve a special notice, because they are so frequently confounded with the first set of teeth. The reason of this is, that those back teeth of the upper and lower jaw on either side make their appearance before any of the first teeth are shed. If neglected, as they too often are, they are early lost, and can never be replaced, except artificially. When you are able to count a row of eleven or twelve in each jaw—that is, as soon as there are more than twenty teeth in all—you may be sure that the last molars on either side belong to the second set.

During the eruption of the milk teeth, children frequently suffer from stomatitis, or inflammation of the soft part of the mouth, due to the irritation

produced by the teeth forcing their way to the surface. The mucous membrane, or lining of the mouth, becomes very red, there is an increased flow of saliva, the parts are irritable and sore, the child is in a feverish state, it is disinclined to put anything in its mouth, or to take food either from the spoon or nipple, because of the pain which it experiences. The irritation and swelling may be so extensive that the entire nervous system becomes affected, and the child is thrown into convulsions. Relief may frequently be obtained by lancing the gums, and thus mitigating the irritating pressure of the incoming teeth, and by spraying the mouth with a solution of fifteen grains of borax, or chlorate of potassium, dissolved in a tumblerful of water, or by painting the cheeks and lips with linseed.

Of course, during dentition children may suffer from many other diseases, none of which are within the province of the dentist. In such cases the physician should be consulted, and much unnecessary pain, if not serious consequences, may be avoided by a timely call.

Very early in life children may acquire bad habits, which shall result in deformity of the teeth, and hence parents should make a strong effort to correct them.

THUMB OR FINGER SUCKING.—By this habit the

lower teeth are forced inwards and the upper teeth outwards. These results are due to the peculiar way in which the fingers rest upon the teeth during the act of sucking. Unless this habit is checked before the permanent teeth appear, it will result in

An irregular dentition due to thumb sucking.

disfiguring them, and speech and mastication will be impaired. The habit may be broken by wrapping the finger with muslin saturated with some harmless preparation, disagreeable to the taste.

Lip Sucking.—This is another habit which may result in depression of the lower teeth. The child, by drawing the lower lip into the mouth, exerts a pressure upon the teeth, and they are forced inward to such an extent that deformity results. The space for the back teeth is greatly contracted, and extraction of one or more is required to make room for all the teeth in the arch.

If the child cannot be broken of this habit in any other way, a fixture similar to a splint ought to be made and put between its teeth and lips, so as to make it impossible to draw the lips into the mouth.

Mouth Breathing.—Mouth breathing also produces irregularity of the teeth. This habit, most commonly indulged during sleep, is frequently due to some nasal obstruction of the air passages. In these cases surgical operations are often necessary. Sometimes the habit is acquired when no organic trouble exists. The most effective way of breaking this habit is that employed by the Indian mother, who bandages the mouth of the child, and in this way forces it to breathe through the nostrils, or not to breathe at all. Rubber appliances, working on the same principle, are in use to-day, only they are free from the barbarous character of the Indian method; that is, they work on the principle of inducing nose breathing, by making it so difficult to breathe through the mouth that the child readily accustoms itself to breathe through its nostrils.

Cracking Nuts, Etc.—Teeth must not be used as nut-crackers. Like the bones, they are not solidified in early life. Even if they are, cracking nuts with them will soon result in their destruction, as they were not intended for such violent work.

CANDIES.—Children should be advised to abstain from candies. I mean cheap candies; those of the best quality are harmless enough, but the cheap candies are frequently mixed with acids and arsenic, the latter being used as coloring material. We need hardly add that these foreign substances are most destructive in their action on the teeth.

EATING.—Children should be prevented from drinking very cold water after partaking of a warm meal. With Americans the use of ice water is very common. Very often after drinking hot coffee or tea, a large quantity of cold water is drunk. This mixture of the warm and cold is very injurious, not only to the stomach, but also to the teeth. The habit should be broken in childhood, because when once formed it is difficult to overcome. But unless the food contains a generous supply of tooth-building material, no amount of cleanliness or correction of bad habits will suffice to preserve the teeth.

An eminent physician, speaking on the subject of food, says: "Our pale-faced boys and girls are brought to this condition by living on butter, sugar and superfine flour. To prepare these articles, the very elements that make bone and tissue are extracted." The child must be fed on plain, substantial food; it must not be too fat or too rich, all pastries being avoided. A teaspoonful of lacto-

phosphate of lime, or lime water, administered three times a day, will add greatly to the strength of the child's teeth.

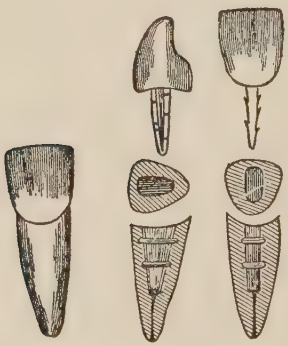
To conclude, let me say that as soon as the milk teeth appear the utmost care should be taken of them. The child should be examined by a dentist at regular intervals, say of six months. It should not have any of the temporary teeth extracted, but have them filled wherever necessary, and so preserve them until the permanent teeth are erupted.

By following these suggestions and bringing to their aid good common sense, mothers may secure to their children a set of strong, healthy teeth, which, with proper care, will last a life-time.

CHAPTER VIII.

CROWN AND BRIDGE WORK.

ALTHOUGH this department of dental practice offers to humanity one of the most useful and ornamental devices yet discovered, very little, as yet, is known of it among the people. By its employment, teeth that it would otherwise be necessary to extract are preserved, and artificial plates are dispensed with. It is certainly more expensive than artificial dentures, but the comfort and convenience afforded, to say nothing of durability, amply repay the outlay.



Crowns for front teeth.

CROWN WORK.—This is the process of attaching artificial crowns to badly decayed teeth, or to roots. There are a number of kinds of crowns used. Those intended for teeth in

the anterior part of the mouth are of porcelain, or have porcelain facings, while those employed for back teeth alone are commonly made of gold only.

The latter class are caps of gold, which completely envelope and enclose the crown of the tooth, and they are used in those cases in which decay has so wrecked them that a filling will fail to preserve them in a satisfactory condition. Surrounded

Crowns for back teeth.

by its gold cap, the tooth cannot come into contact with foreign substances, so that it is almost impossible for decay to recur.

For front teeth, crowns with porcelain facings are employed, to prevent the unsightly appearance of such an apparent mass of metal. The porcelain facing gives to the tooth a natural appearance.

Formerly, the work of crowning, which demands great skill and discrimination, was confined mainly to the back teeth; but the modern dentist, having

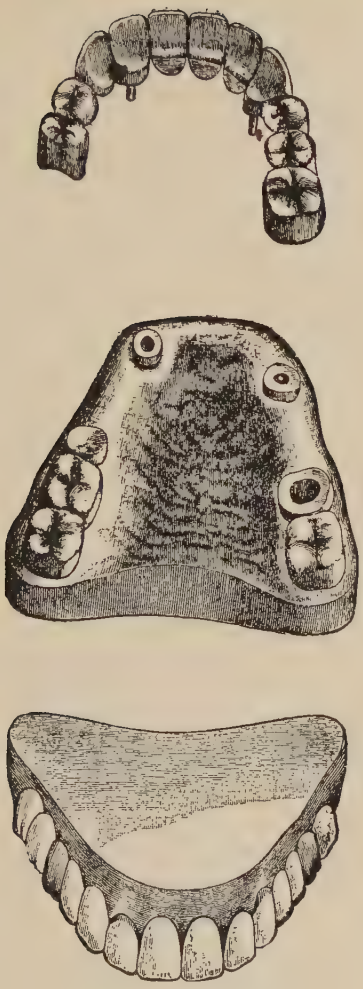
improved methods of manipulation, successfully operates on any tooth, if it have but roots which are firmly imbedded in the jaw.

Bridge Work.—When there are two or more sound roots or teeth, with spaces from which teeth have been lost between them, it is possible to supply the missing teeth by constructing a bridge of crowns across the vacancy.

The crowns are soldered to each other, the terminal ones being firmly attached to the sound teeth or roots, in such manner that each of the intermediate crowns occupies the space of a missing tooth. They may be constructed with a porcelain facing, so that the whole work shall present to the observer a most natural appearance. There are a variety of methods for constructing these bridges, each excellent in itself, and each specially adapted to some particular class of cases.

Artificial Crown.

Bridge work has been condemned by many dentists of high standing, because it has been so much abused through its improper use. Some practitioners, either because of a mistaken enthusiasm or from some less worthy motive, have inserted bridges upon insecure or diseased roots, with the natural consequence of their early failure. Others have not hesi-



A piece of Bridge Work.

tated to sacrifice good and serviceable teeth for the purpose of putting in bridges. All these possible abuses do not excuse the wholesale denunciations of that which is proper and correct practice. As well might one condemn the filling of teeth, because poor work is sometimes done.

One of the most attractive features of this kind of work is that, when properly made and inserted, the patient soon loses all consciousness of its artificiality. The crowns and teeth being attached to natural roots and immovable, approach more nearly to the natural organs, and the patient suffers less discomfort than from any other artificial substitutes.

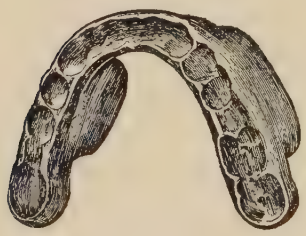
CHAPTER IX.

FRACTURED JAWS.

To the great majority of people the word "dentist" conveys but one idea—that of a tooth-puller. It is true that in the past dentistry was practiced to a large extent by persons engaged in some other pursuit, and without any professional education whatever. The blacksmith, barber, watchmaker, and others of the same class, were the dentists of every village and town. Even in some of our largest cities, dentists of this kind were, until quite lately, found practicing under the very shadows of the Universities and Medical schools. The explanation of this seems to be that mere tooth drawing constituted the surgical dentistry of those days, and as the operation of extraction is one requiring muscular strength and manual dexterity rather than anatomical knowledge and surgical skill, and was performed as successfully by the irregular as by the regular practitioner, it had not many attractions for medical men. Dentistry was, ac-

cordingly, assigned to the uneducated and the charlatan.

To-day, however, the province of dentistry embraces the art of treating the diseases and lesions of the teeth, and supplying artificial substitutes for these organs when lost. Diseases of the teeth and mouth are not always local affections, but may, and very frequently do, arise from constitutional causes; hence the dentist who is thoroughly qualified to heal, as well as to repair and ameliorate, must be both a surgeon and a physician. He must be skilled, not only in the mechanical, but also in the therapeutical department of his profession. As a result, many affections of the teeth and the various portions of the mouth, for the treatment of which people in former times had recourse to the physician or the surgeon, to-day more properly are relegated to the dentist, who, making a specialty of these parts, is thoroughly familiar with them, and can properly be termed a specialist in diseases of the mouth.



Interdental Splint.

This fact is so well appreciated by the general

practitioners in medicine and surgery, that they have no hesitancy in referring their patients to the dentist in every case of oral disease, independent of any affection of the teeth, and particularly is this the case in fractures.

Fractured Jaws.—In discussing this subject, I wish at the outset to mention the fact that they are most frequently due to direct manual blows received in fights. They may also be the result of kicks, falls and other forms of violence. Fractures of the lower jaw are most frequent, those of the upper jaw being rarely encountered.

The lower jaw has its weakest place between the canine and bicuspid teeth, owing to the long roots of the former, and it is at this point that fractures are most often met, although they may occur in any other part of the bone. Out of a great number of fractured jaws that have been under my treatment, four-fifths were due to violent blows received during quarrels, the remaining one-fifth occurring through accidents. In most of these cases the jaw was fractured between the canine and bicuspid teeth.

In newly fractured jaws there is a slight movement of the broken parts, which can be felt by pressing them with the fingers. The simplest method of detecting a fracture is as follows:

Grasp the jaw with both hands, applied on each side of the apparent seat of injury, so as to hold the bone between the thumb and index fingers; then, by slight opposite movements directed both upward and downward, a positive conclusion may be reached through the mobility of the parts. In badly fractured jaws the teeth are irregular, owing to the alteration of the level of the fractured parts, and when

Interdental Splint. View of upper surface.

Interdental Splint. View of under surface.

the jaws are brought together they do not meet as formerly, while very frequently the jaws cannot be closed at all. On the slightest pressure or movement severe pain is felt, and inflammation, and usually suppuration, succeed.

The jaw should be kept at rest, and all irritation of the fractured parts through movements caused by conversation, eating, etc., should be carefully avoided. No time should be lost in visiting the

dentist, for the more recent the fracture the more readily can it be reduced, and the more rapid will be the healing process. For the treatment of fractured jaws the interdental splint has been devised, by the aid of which they are quickly and easily healed.

This splint is made in the shape of a horseshoe, so as to correspond precisely to the arches of both the upper and lower jaws. The two wide surfaces have depressions into which, when it is placed between the two arches, the crowns of the upper and lower teeth fit accurately. That is, the crowns of the superior teeth fit into depressions in the upper surface of the splint, while the crowns of the inferior teeth are in the same manner received by the lower surface of this appliance. Thus, when the splint is placed in the mouth, the teeth and jaws become locked and immovable.

Splint retained by a skull cap.

In the center of the splint there is an opening for

the reception of fluid food. Nature unites the fractured bone by the formation of new bone around and between the broken parts, when they are brought into accurate coaptation and kept immovable for a certain time, and preserved in good hygienic condition.

In compliance with these principles, all interdental splints are constructed to fit the mouth as though no fracture had occurred. When such a splint is applied to the mouth, the fractured parts must, of necessity, by a slight pressure, resume their original position, and then nature does the rest.

It usually takes from three to six weeks for a perfect union to be effected. I have dwelt at some length on fractures and splints, because I wish, first, to show how easily a fractured jaw can be healed through the aid of a splint; and secondly, to dissipate the distrust with which some people are apt to regard those dental surgeons who undertake to perform such operations. To illustrate the second point more forcibly, I will relate the following case:

A short time ago a lad, four or five years of age, was kicked by a horse, and his lower jaw was broken. I was called in as consulting dentist, and suggested the use of the splint. As the parents had never heard of this device, they immediately became

distrustful, and by their misgivings and fretfulness greatly interfered with the work of fitting the splint. Even after it had been introduced into the child's mouth, it was with the utmost difficulty that they were prevented from removing it. In the course of a few weeks the fracture was completely healed, and I may add that the parents were thoroughly cured of their distrust.

CHAPTER X.

CLEFT PALATES.

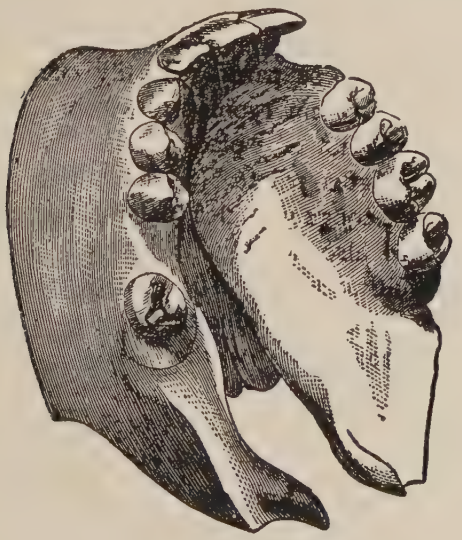
NATURE'S freaks are so numerous and unlooked for that her infallibility becomes a matter of grave suspicion. The deaf, the mute, the lame and the afflicted, daily born into the world, are examples of her many whims and caprices. Were it not for the unwearied efforts of science, these unfortunate victims would find life well-nigh intolerable.

Thanks, however, to a broad philanthropy, the blind can be taught to read and to write, the deaf and dumb to communicate with those about them, while the deformed are enabled in a great measure to overcome their natural defects and to be placed upon the same level with their neighbors.

Few, if any, are more entitled to our sympathy and our best efforts for relief than those unfortunate ones who are born into the world with a defective palate, for they are thereby deprived of one of the greatest blessings bestowed upon man, the faculty of

distinct speech, as well as the power properly to perform the functions of mastication and deglutition.

The palate is the roof of the mouth. It consists



Cleft through the hard and soft palates.

of two parts, the hard and the soft palate. The former is of bony, while the latter is of muscular tissue. The hard palate serves not only as the roof of the mouth, but also as the floor of the nose. The soft palate is suspended like a curtain from the posterior edge of the hard palate.

Its function is very important, and consists, dur-

ing deglutition, in closing the passage from the pharynx into the posterior nares, so that food may not get into the nose.

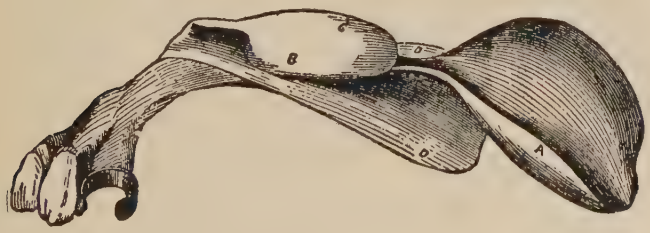
Each palate is, moreover, divided into two parts, which are united in the median line of the mouth. The union of these parts generally occurs during the third week of embryonic life. Sometimes, however, this does not take place, and the child is born with a perforated palate. Such an one is technically called a congenital cleft palate.

There are also accidental cleft palates, due to disease resulting from an irregular and debauched life. Cleft palates of the latter class are much more numerous than those of the former. Congenital cleft palates vary in size and form. Sometimes both hard and soft palates are perforated. In such cases the interior of the nose and the bones of the skull are exposed, and the whole presents a very ghastly appearance.

Accidental, or acquired, cleft palates also vary, and either the soft or hard tissues, or both, may be affected.

In congenital cases the sufferer does not experience any great inconvenience during the process of deglutition, as the instinct of self-preservation has from childhood taught the sufferer to close the cleft with the tongue. Then, by placing the food under

that organ, it is shifted from side to side until forced into the pharynx. This process is a very curious and complicated one. None of us, try as hard as he may, could imitate it. For this reason, if one becomes afflicted with such a palate in adult life, he can in no way accustom himself to close the opening with his tongue, and, therefore, whenever he attempts to eat, a portion of the food is invariably forced into the nose. The patient thus not only suffers great inconvenience, but it becomes the source of constant humiliation.



Obturator with partial Upper Plate.

But by far the greatest embarrassment to which these sufferers are subjected, whether the cleft be congenital or acquired, arises from their inability to speak clearly and distinctly. For a distinct utterance of vocal sounds every part of the mouth is essential. In many cases, indeed, the cleft makes speech utterly impossible.

Formerly, to remedy these evils recourse was had to surgical operation. Staphylorraphy, which means suturing or sewing together, was the most common remedial measure. But this operation in many cases proved unsuccessful.

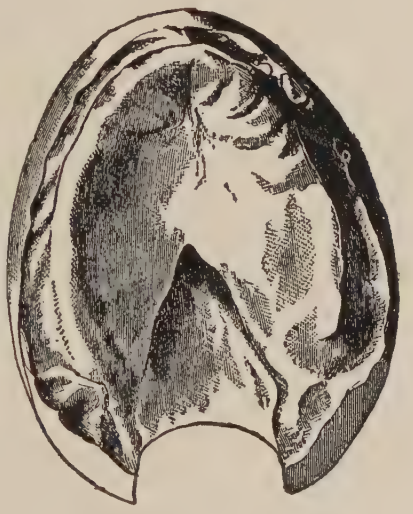
Upper denture with artificial soft palate.

It consisted in paring the edges of the cleft, and then sewing them together. This necessitated the stretching of the soft parts to such a degree that they would eventually rupture. Dentistry has succeeded in constructing an appliance which, by taking the place of the lost parts, enables the palate properly to perform its functions. These contrivances are known under the name of obturators.

Where the hard palate alone is perforated, the obturator is very simple. It consists of an ordinary artificial plate, extending over the cleft.

But where the soft palate is involved, it is very complicated and difficult of construction. In such cases the obturator consists of an artificial plate, to

the posterior edge of which is attached a pendulous body, corresponding in size and shape to the missing soft palate, and fitting exactly in its place.



Upper Jaw without teeth, showing cleft palate.

In some cases this pendulous body is given a hinge movement, the muscles of the mouth enabling it to perform all the functions of the soft palate. The obturators are held in position by means of clasps or rings, which embrace the natural teeth, as it is impossible, owing to the cleft, to utilize the forces of adhesion and atmospheric pressure, as would be done in the case of artificial dentures.

The use of the obturator has never failed to restore clearness and distinctness to speech, or the power properly to perform the process of deglutition. Of course, in congenital clefts, the sufferer

has never known how to utter the proper sounds, and for this reason it requires a great deal of patience and perseverance on his part before he is able to do so. He must learn just like a young child. But in the case of acquired clefts, the patient still retains the knowledge of the former method of utterance; he only needs some contrivance to close up the cleft, to restore to him the power of speech. So it can readily be seen that when the palates, or either of them, are perforated, the plate and the pendulous body thereto attached, if properly made, will completely close the entrance to the nose and prevent the food from being forced into it.

The obturator is an excellent example of the many benefits modern dentistry has conferred upon mankind. By its means men are restored to society, who, either through the misfortune of birth or from wantonness, have become to others an object of pity—to themselves, one of disgust.

CHAPTER XI.

HINTS ON HOME REMEDIES.

People are frequently seized with toothache at times when it is almost impossible to visit the dentist. On such occasions they listen eagerly to the advice of kind and sympathetic friends, each of whom has some pet medicine to recommend that he is convinced will prove efficacious; these remedies too often are only active in burning the patient's mouth, so when one of these self-doctored sufferers obtains professional advice, the tissues are so inflamed that before the teeth can be treated the work of home doctoring must be undone.

Recognizing the difficulties under which one labors who is thus suddenly attacked, I have determined in this chapter to lay down a few suggestions, which, if properly followed, will enable patients to treat themselves in an intelligent and effective manner until they can reach the dentist. Of course, in a book such as this, it is impossible to speak of every disease that may affect the teeth.

To attempt it would result in producing a work not only very voluminous, but also very confusing, as the distinctions between many of the disorders are very subtle, and comprehensible only to the dentist. There are others, however, whose cause even a layman can readily ascertain, and to which some simple remedy may be temporarily applied with good effect. I shall treat in this chapter of the following maladies:

I. Aching teeth, with a cavity caused by decay. Of these there are two classes:
   A. When the pulp within the cavity is living.
   B. When the pulp within the cavity is dead.

II. Filled teeth that ache. Of these there are two classes:
   A. When the pulp is living.
   B. When the pulp is dead.

III. Aching gums. These are usually due to one of the following causes:
   A. Tartar.
   B. A cold.
   C. Recent cleaning of teeth.
   D. Extraction of teeth.

IV. Hemorrhage

V. Neuralgia.
VI. Foul breath.
VII. Dislocated jaw.
VIII. Faintness after extraction.
IX. Food to be used in place of solid food.

When suffering from toothache, find out if any of the teeth have a cavity; you can do this by probing the teeth with an ordinary toothpick, or some similar instrument. If you discover a cavity, determine whether the pulp within the cavity is living or dead.

I. Aching Teeth with a Cavity of Decay.

A. When the Pulp is Living.

Diagnosis.—To determine whether the pulp is living or dead, take some very warm or very cold water in the mouth, and bring it in contact with the pulp. If the pain is thereby increased, the pulp is living. Another very simple method for determining whether the pulp is living or not, is to insert a toothpick into the cavity and press upon the pulp. If the pain thereby is intensified, the pulp is living. In fact, living pulps are so sensitive that the introduction of any foreign material into the cavity will greatly increase the suffering.

TREATMENT.—Wash out the cavity, either by rinsing the mouth with lukewarm water, or by employing a syringe, if one is at hand. After the cavity is thoroughly cleaned, insert into it a pellet, or little ball of cotton, saturated with spirits of camphor, oil of cloves or laudanum. Over the pellet insert a piece of dry cotton, so as completely to fill the cavity, and thus protect the pulp from sudden changes of temperature, or the intrusion of foreign substances.

B. ACHING TEETH WHEN THE PULP IS DEAD.

DIAGNOSIS.—Of these teeth there are two kinds; in the first, the patient suffers from mere inflammation of the lining membrane between the root and the socket; in the second, the inflammation has developed an abscess or gumboil. Prompt treatment in the first stage of the disease may prevent the second. The symptoms of the two stages are alike, except that in the second there is a swelling of the gums around the tooth. The teeth are elongated above the level of the surrounding ones, and are very sore, so that on closing the mouth they are struck first and a painful shock is experienced. They are also discolored, or somewhat darker than the surrounding teeth; a bad odor also sometimes issues from them.

TREATMENT.—For the first stage, or that in which there is mere inflammation of the lining membrane:

1st. Apply a dental plaster to the gums. It may be obtained at almost any drug store. Or,

2d. Rub iodine and aconite in equal parts around the gums with cotton, or a camel's-hair brush; before the mixture is applied, dry the gums thoroughly. The iodine and aconite induce a healthy flow of the blood, and facilitate the removal of the waste material. Be careful not to swallow the remedies, as they are poisonous. Or,

3d. Apply a leech to the gums, through a tube. Or,

4th. Employ a cathartic; it will reduce the quantity of water in the blood, and by limiting the blood pressure afford relief.

TREATMENT.—For the second stage, or that in which the inflammation has developed an abscess:

1st. Apply warm poultices of capsicum, or flaxseed, or raisins.

CAPSICUM POULTICE.—Place in a small cotton bag a mixture consisting of three parts of flour and one of red-pepper or capsicum. Warm this and apply it over the head of the abscess within the mouth. It should be changed every three hours.

FLAXSEED POULTICES.—These may be made by

wrapping flaxseed in strips of linen, two by three inches; after heating them, apply them around the abscessed gum; as soon as the poultice becomes cool, remove it and substitute a warm one. The abscess is thus brought to a head and prepared for the lance of the dentist. Patients should never attempt to do their own lancing, lest they induce blood poisoning.

Raisin Poultice.—This may be made by cutting a number of large raisins into halves, taking out the seeds and heating them. One of these should be applied to the gums, directly above the abscess. As soon as it becomes cool, change it for a warm one. Continue this treatment for several hours.

As the breath is feverish and foul during the development of an abscess, the patient should use either of the following mouth-washes several times a day:

1st. Rinse the mouth with a solution made from a teaspoonful of bicarbonate of soda in a glass of warm water.

2d. Or, the following: Carbolic acid, two drams; glycerine, four drams; rose water, ten ounces.

Sometimes the abscess is so large that the cheek is swollen. In such cases apply cold applications to the face, in addition to the warm applications to the

gums. Never apply heat externally, lest the abscess burst there and leave behind it an ugly scar.

II. Teeth that Ache after being Filled.

Diagnosis.—Sometimes a tooth is prematurely filled by the dentist; that is to say, he fills the tooth before he has thoroughly quieted the nerve, in a case in which the pulp is living; or in one in which the pulp is dead, he fills the tooth before he has thoroughly disinfected the pulp chamber and removed the dead pulp. It may also happen that after the cavity has been filled, in spite of all precautions, the pulp dies beneath the filling; hence arise two classes of these diseased teeth—those with living pulps, and those with dead pulps.

When the pulp is alive beneath the filling, the patient may suffer from jumping, or intermittent toothache.

Treatment.—Any one of the following measures may be employed:

1st. Take a hot foot-bath; this will equalize the circulation, and by relieving the blood pressure will relieve the pain.

2d. Take a saline cathartic, like magnesia or epsom salts; this will diminish the quantity of water in the blood, and so will relieve the blood pressure on the pulp.

B. WHEN THE PULP IS DEAD BENEATH THE FILLING.

DIAGNOSIS.—The same as in the case of unfilled teeth with dead pulps.

TREATMENT.—Also the same. (See disease I, subdivision B.)

III. ACHING GUMS.

This may be due to an accumulation of tartar underneath them, to colds, to laceration due to extraction, or to the irritation produced by a recent cleaning of the teeth.

A. ACCUMULATION OF TARTAR.

DIAGNOSIS.—The gums have receded from the necks of the teeth, the teeth are loose, the breath is foul, and pus oozes from the gums.

TREATMENT.—Rinse the mouth with tepid water, in which one or two teaspoonfuls of bicarbonate of soda have been dissolved. Use the solution at intervals of an hour.

B. COLDS.

DIAGNOSIS.—The pain results from the inflammation caused by exposure to currents of air below the normal temperature of the body.

TREATMENT.—Paint or rub the gums with a mixture of equal parts of aconite and iodine, or rinse the mouth with a solution of one dram of borax, or chlorate of potash, in a glass of water.

C. PAINFUL SENSATION FROM RECENT CLEANING.

DIAGNOSIS.—After the teeth have been cleaned by the dentist, they ache for a day or two, and are somewhat sensitive.

TREATMENT.—Rinse the mouth with either of the following mouth-washes:

1st. Dissolve a teaspoonful of common salt in a glass of warm water, to be used every half hour.

2d. Rinse the mouth with a mild solution of bicarbonate of soda.

D. LACERATED GUMS AFTER EXTRACTION.

DIAGNOSIS.—After the teeth have been extracted, if the gums are lacerated and torn the patient will suffer considerable pain. The breath may also be foul, because of consequent sloughing.

TREATMENT.—Use tincture of calendula, dilute it with an equal quantity of water, as a mouth-wash every three hours. It hardens the gums, soothes the pain, and sweetens the breath.

IV. Hemorrhage.

Diagnosis.—It sometimes happens that the extraction of a tooth is followed by excessive hemorrhage or bleeding, due to a lack of coagulation or thickening property in the blood, or to a hereditary tendency to hemorrhage.

There are two stages of hemorrhage—the primary and the secondary. The primary occurs at the extraction of a tooth, and is normal; the second hemorrhage may occur several hours, or even a day or two after the teeth have been extracted.

Treatment.—Place the patient in a reclining position, with his head higher than the rest of his body, and apply bags of hot water to his feet. His position will prevent a determination to the head, and the water bags will draw the blood to the lower extremities.

Before applying any remedies to the cavity, wash it very carefully with warm water, or the remedy will not prove as effective.

Make a firm plug of styptic cotton and force it into the cavity; cut a notch in a cork of suitable size, so that it may sit astride the gum; then close the mouth firmly upon it, and bandage. By this means the cotton will be forced far into the cavity, and thus check the flow of blood.

Hold in the mouth, until bleeding has stopped, a portion of a solution of two drams of borax in a glass of warm water.

The bleeding cavity may also be plugged with leather scrapings, alum, cob-webs, or pieces of sponge saturated in nut-galls. Any one of these will usually suffice to check the hemorrhage.

While these remedies are being employed, the physician or dentist should be sent for without delay.

V. Neuralgia.

Diagnosis.—Neuralgia is usually due to a bad condition of the teeth, but it may arise from some general disease, for the teeth may be perfectly sound and yet the patient suffer from intense neuralgia.

Here let me say that I shall dismiss the neuralgias due to constitutional conditions from consideration, as their treatment lies within the province of the physician.

The nerves of the face are very numerous and closely connected. They form a complex net-work, which is instantly aroused if any of the filaments are irritated.

In the sensitiveness and rapidity of their transmissions, nerves are like electric wires; an aching

tooth may thus cause intense neuralgia, by inducing sympathetic pain among the nerves of the face and the head. Such pain, of course, can only be assuaged by allaying the pain in the tooth. Hence, to check neuralgia due to any of the teeth, the patient need only ascertain what particular ailment —as cold, tartar, recent extraction, a dead or a living pulp—causes the pain, and apply the proper remedy.

VI. Foul Breath.

This is one of the most offensive and annoying features accompanying decayed or filthy teeth. It makes its victim a nuisance in society, as he becomes absolutely repulsive, and yet it is rarely referred to, from mistaken notions of delicacy. As a rule, the patient is quite unaware of his condition. Sometimes it arises from a disordered stomach, catarrhal troubles, or some general disease. If this be the case, the care lies with the physician, but if it arises from bad or filthy teeth, he should see the dentist, and in the meantime rinse the mouth two or three times a day with tepid water, in which two or three grains of permanganate of potash have been dissolved. By cultivating the habit of using some reliable antiseptic mouth-wash daily, good results would invariably follow.

VII. Artificial Teeth.

Diagnosis.—Before becoming accustomed to artificial teeth, the wearer generally suffers from soreness of the palate. It may be due to the fact that the plate is not accurately fitted, or that the gums have not sufficiently healed, but more often it may be attributed to the novelty of having an artificial contrivance in the mouth.

Treatment.—Remove the teeth for a few days, to allow the mouth to resume its normal condition. If there is considerable soreness, use the following wash:

Take a lump of alum, the size of a black-walnut, and place it in a half glass of water. Keep it there for five minutes; then rinse the mouth with the solution.

With a camel's-hair brush paint the sore places of the mouth, or the corresponding positions on the plate, with the following:

Into a two-ounce bottle, with a wide mouth, put an ounce of glycerine, place it in a hot bath, and stir in slowly two ounces of tannic acid.

This will also be found an excellent remedy for the lips when chapped or made sore by dental operations.

If these do not afford relief, see the dentist. Here let me say that much unnecessary suffering is

the result of persistently removing the plate and allowing it to remain out of the mouth for a greater or less period of time, while the patient is becoming habituated to it. In spite of some pain and inconvenience he should persevere, and only when the intensity of his suffering becomes unbearable should the plate be removed, and the treatment above outlined be employed.

VIII. Dislocated Jaws.

Diagnosis.—Sometimes during laughing, vomiting, etc., the lower jaw is dislocated; that is to say, the joints or condyles are forced out of the sockets. When this is the case it will be found impossible to close the mouth, or to move the lower jaw.

Treatment.—I. Let the patient sit in a low chair that is tilted backward so that the head rests firmly against the wall. Next let some friend wrap his thumbs in a napkin or some other material that will protect them against being bitten, and grasping the sufferer's chin, so that the thumbs rest upon the upper surface of the lower back teeth, while the remaining fingers encircle the outside of the chin, let him exert a quick downward and backward pressure, and the jaw will be forced into place.

II. Take a stick of convenient size and about a foot long, and apply one end of it to the upper

surface of the lower back teeth on one side; raise the free end of it upward, thus using it as a lever, and exerting great downward and backward pressure, when the jaw will be sprung into place on that side. Do precisely the same thing on the other side, and this will also assume its proper position.

A Dislocated Jaw.

IX. Gas Extraction.

Diagnosis.—Sometimes after gas has been administered, a strong feeling of drowsiness seizes the patient.

Treatment.—Let him get into the fresh air, and inhale large draughts of it, also taking a little brandy to stimulate the action of the heart. If the desire for sleep be not gratified, the drowsiness will soon pass away.

X. When the gums are lacerated after extrac-

tion, it is sometimes impossible to eat solid food. Make a mixture consisting of a glass of boiled milk, two soft-boiled eggs, and some sugar; drink this and it will prove as nourishing as a good-sized steak.

In conclusion, let me say that these remedies are but make-shifts; they may afford temporary relief from pain, but they do not remove the cause of it. This remains, and with every recurrence of the pain the efficacy of the remedies becomes less and less, until finally it is reduced to nothing. Hence there can be but one source of permanent relief, and that is to strike at the root of the trouble; thus, if you suffer from the accumulation of tartar, let the dentist remove it; if you suffer from aching filled teeth, have him either extract them, or take out the fillings and prepare them again for fresh filling.

Let the patient remember, too, that it is not sufficient to have only the aching teeth attended to; wherever it is necessary, let them be cleaned, filled or capped, for thus only can every source of disease be removed and the mouth be restored to a healthy condition.

CHAPTER XII.

QUACKERY.

EVERY family has its black sheep, all professions their quacks; and dentistry is no exception to the general rule. Here, much more easily than in any other profession, deceit and ignorance may be palmed off upon the layman for a considerable length of time, with little fear of detection or exposure. You are all familiar with his quackship, who may be recognized by his gaudy signs and alluring advertisements. Here are some of them:

"Teeth cleaned for 50 cents!"

"Teeth filled for 50 cents!"

"Teeth extracted with pain for 25 cents; without pain for 50 cents!"

"Artificial teeth made for $5.00 while you wait!"

Enticing signs, these, are they not?

"Teeth cleaned for 50 cents!"

How can a reputable dentist clean a set of teeth for this sum? How can any professional man live as befits his station, and meet the current expenses

of his office, and work for fifty cents an hour? No dentist, however skilled and ingenious he may be, can on an average thoroughly clean a set of teeth in less than an hour, and how often, when the mouth is very filthy, must he work even two and three hours. It requires this length of time to clean a set of teeth, because, as I have shown in a preceding chapter, cleaning the teeth does not consist in merely giving to exposed surfaces a bright polish, but in thoroughly removing the tartar from beneath the gums, where it has accumulated in thick incrusting cakes.

How then, you will ask, can the quack clean the teeth for 50 cents? How? Through the use of destructive agents. By the application of a powerful acid he can do the work of hours in a few moments. But for the reasons that I have already explained, in those few minutes the action of the acid has wrought greater destruction than many years of wear and tear could effect. This is how the quack works, and that is why he can work cheaply.

"Teeth filled for fifty cents!"

How can any reputable dentist afford to fill a tooth for that sum? How? Listen to the experience of Mr. A., which is that of hundreds of others:

"I had my teeth filled by the dentist, and the pain was intensified a thousand fold. I suffered from

jumping toothache, and from abscesses, until I was almost driven wild. It was not until the filling fell out of the tooth (thanks to bad workmanship) that I obtained any relief from the severity of my sufferings." Upon carefully questioning the indignant complainant, it leaked out that he had been enticed into the parlors of the 50-cent dentist.

Good filling requires that the dentist should carefully examine the tooth before he undertakes to fill it, so that he may discover whether it is alive or dead. If it is living, before he can fill it the pulp must be soothed; and if it is dead, the pulp-chamber and canals must be thoroughly cleaned and disinfected.

This preliminary work is laborious and difficult, and no dentist can undertake it for the mere pittance my complaining friend so generously paid. If he suffered from jumping toothache, it was because the dentist worked the filling into the tooth before the inflamed pulp was quieted, and so aggravated its irritated condition. If he suffered from abscesses and swellings, it was because his tooth was filled before the pulp-chamber and canals were properly disinfected. If the filling fell out shortly after it was put in, it was because the dentist had not spent a sufficient and necessary length of time in shaping the cavity for its retention.

"Teeth extracted with pain for 25 cents; without pain for 50 cents!"

The quack excels in one department of dentistry —extraction. He takes out everything that comes in his way. Extraction is a joy to his heart. He glories and revels in it. Never by any chance does he advise his patient to have a tooth filled, capped, or crowned, or to employ any one of the numerous excellent contrivances which modern dentistry has invented. He always urges that it be pulled. The task of extraction is brief, and the remuneration comparatively high, when one considers that he charges the same price for the more difficult work of filling or cleaning.

The harm thus worked by the quack is incalculable. Many a tooth thus ruthlessly removed might have been saved by the reputable dentist. The majority of decaying teeth are not so far gone but that the skilful practitioner can, by some one of the many ingenious means in vogue, manage to preserve them.

"Artificial teeth made for $5.00 while you wait!"

How absurd. No one, be he ever so clever, can make a set of teeth in less than a day or two, nor can any dentist, without sacrificing the welfare of his patient, afford to make teeth at such ridiculously low figures.

Two elements enter into determining the value of a set of artificial teeth—workmanship and material.

Workmanship.—This includes: 1st, natural appearance; 2d, accurate fit; 3d, such adaptation as will enable the possessor to perform mastication and articulation.

Natural Appearance.—The teeth must be so constructed as to preserve all the characteristics of the natural organs, and conform to the physiognomy of the patient. Shall they be large and powerful, small and dainty, or shall they be of medium size? What hue and shade shall be selected? These are questions that the dentist can only answer after careful study of each individual case, for the patient can readily perceive that a set of teeth may be of very fine material, and yet may mar his appearance, because they are not in harmony with his general facial expression.

Accuracy of Fit.—Perfect adaptability of the denture to the tissues is necessary, in order that it may set firmly in the mouth. This adaptability can only be obtained at a great expenditure of time, which the quack cannot afford, since he must compensate his cheapness of price by rapidity of work.

Dental plates are manufactured on models made from impressions of the mouth. These impressions may be taken in wax, or some similar com-

pound, or in plaster-of-paris. The former are taken easily, but they are inaccurate. The latter are obtained with difficulty, but they are exact. It is needless to say that our friends of the flourishing advertisements always dabble with wax and similar materials.

Mastication and Articulation.—I need hardly tell the reader that unless the teeth are well constructed, mastication and articulation can only be performed with great difficulty and inconvenience.

MATERIAL.—Many people labor under the impression that artificial teeth are all of the same grade of material. This view is erroneous. Just as our clothing may be of inferior or superior quality, so it is with the porcelain from which artificial teeth are manufactured.

There are two classes of porcelain teeth. One possesses such a remarkably vital appearance, that when put alongside of the natural teeth the most critical eye will often fail to distinguish between them. This close imitation results from study, and refined, artistic taste.

The other class has a dull, opaque and lifeless appearance. It lacks all those essential characteristic features which make the former kind of porcelain invaluable in dental art.

The reason, therefore, why the quack works at

such low figures is, that he employs poor workmanship and poor material. The better class of porcelain is worth fully three times as much as the inferior kind, and as to the relative values of good and bad workmanship, there can be no comparison whatever. The quack works minutes, while the painstaking dentist works hours.

Poor teeth are injurious, physically, æsthetically and financially.

Physically, because they are a source of discomfort to the patient. Æsthetically, because they mar his appearance, and financially, because they are not durable.

Teeth are necessities, not luxuries. Bad is the policy, and worse the intelligence that will, for the sake of apparently saving a few dollars, buy ugly trash instead of valuable and durable material. The few dollars' difference in the price between good and bad teeth are, I say, only seemingly saved. This is true, because the poorer class of teeth are worthless in every respect, whether as masticators, articulators, or beautifiers, and they must soon be discarded for something better.

As usual, the greatest sufferers at the hands of the quack are the poorer people, who are readily attracted by the cheap prices and the golden promises of speedy benefits. For them we may have

sympathy. There is, however, a class of people who have the means wherewith to pay for good dental work, and whom experience should have taught that whatever is abnormally cheap is worthless. For them there is no excuse. If they have been deceived, they have only obtained their just deserts. Poverty may be offered as an extenuation, but for greed there is no excuse.

In the long run it will pay rich and poor alike to select a dentist, not from the standpoint of cheapness, but of ability. It is true that he may charge what appear to be large prices, but the patient will have the satisfaction of knowing that he has had faithful work, and that he has been given the benefit of the best fruits of great industry and knowledge.

As a matter of fact, however, not even the poor man has any reason for resorting to the quack, for every good dentist is imbued with such a love for his profession that he considers not alone the financial side, but is always ready to made due allowance for those who cannot afford to pay him his regular fees. Nothing then, save a false sentiment of pride which may make him ashamed to ask for the reduction, need drive the poor patient from the doors of the skilled practitioner to the quack.

I have sought, in this chapter, to point out the

delusion of cheap prices, and the danger and menace that the quack is to society. If I have succeeded, I shall have rendered an important service to every one who is obliged to seek the services of the dentist.

CHAPTER XIII.

THE NECESSITY OF SCHOOL INSTRUCTION IN DENTAL HYGIENE.

Of all the professions, probably none has made such extraordinary progress within the last century as that of dentistry. The increase in the number of practitioners alone has been wonderful. During the War of the Revolution, the name of Robert Woofendale is mentioned as that of the only dentist in America. During the following half century, that is, up to a period within the memory of persons still living, the profession was still almost entirely confined to itinerant practitioners, one of whom relates that, in 1817, while traveling from place to place between Philadelphia and New Orleans, he did not meet with a single person calling himself dentist. Yet, by 1850, the number of practicing dentists in the United States had increased to nearly three thousand; twenty years later, to approximately eight thousand; and by 1900, according to the recent census, this number was augmented to 29,683.

This tremendous growth in numbers during a period of fifty years is accompanied by an equally astonishing increase of prestige and influence. A profession, the exercise of which had been relegated chiefly to barbers, and subsequently to chemists, upon the establishment of the first college of dentistry in Baltimore in 1849, was invested with a certain dignity and independence. The example of Baltimore was rapidly imitated in other parts of the United States, as well as abroad, and from seven colleges in 1869 the number has been increased until to-day the dental profession is represented by hundreds of similar institutions throughout the world.

The rapid increase of these collegiate institutions; the introduction of dental courses into the curriculum of universities, beginning with Harvard in 1867; and the multiplication of dental journals, following upon the first publication of the American Journal of Dental Science in 1839—all these have tended to stimulate that active spirit of investigation which characterizes the dental profession to-day.

This spirit of investigation has demonstrated the extremely close relation between dentistry and other branches of medical science, and has shown to what an extraordinary degree the condition of the teeth

affects the general health of the body. At the same time, the accumulated private experience of dentists, as well as the statistical investigations recently conducted, have revealed the almost incredible ignorance on this subject prevailing among the public in general. True, the dental profession itself stands high in public esteem. The proverbial mechanical skill of the American dentist has served to spread his fame throughout the world and has everywhere gained for him confidence and respect. The public itself, however—and I am here referring to the great mass of the population—while appreciating the skill of the dental operator, is still in a condition of lamentable ignorance regarding the fundamental importance of sound and healthy teeth. That spirit of indifference toward a vital and elementary function which once thought a barber or a glazier sufficiently competent to draw teeth and a goldsmith to fill them, is to-day revealed in the shameful neglect of the dental organs prevailing among millions of people, and the almost total disregard of all hygienic safeguards tending toward their preservation. Specialists are consulted in all cases where complicated internal diseases are involved, while the neglect of the very organs from which those diseases frequently proceed goes on as before.

This close relation between the teeth and innu-

merable diseased conditions of the body has been brought to light by investigations in the realm of dentistry and in the wider sphere of medicine. The serious nature of some of the purely local disorders arising from decayed and defective teeth has frequently been explained and illustrated by the author in the series of lectures delivered by him under the auspices of the New York Board of Education. That various maladies of the eye and ear may be traced to the same source is now generally recognized; inflammatory and nervous conditions spreading from the teeth to the other organs of the head have been known seriously to affect the sight and hearing. How largely our national disorder, dyspepsia, with its dire consequences may be ascribed to this cause, has been time and again demonstrated; and the same may be said of that almost equally prevalent malady, neuralgia. Even lockjaw and epilepsy have been known to result from diseased conditions of the mouth, engendered by decayed teeth.

The neglect of the teeth is, therefore, perhaps, one of the earliest, most immediate, and most far-reaching causes of disease, a fact which alone should urge the advisability of making dental hygiene a matter of public instruction. A more immediate reason, however, may be found in the fact that the

mouth, "the best of all incubators," as it has been called, may become a prolific and constant source of dangerous maladies. Nowhere do human beings congregate together more closely and constantly than in the schoolroom, and nowhere can contagious diseases be more easily propagated. Light and air, and cleanliness of face, hands and apparel, on the part of our children, are now considered indispensable requirements in nearly every public school throughout the country. But the fact is utterly disregarded that a single unclean mouth, despite all superficial precautions, may vitiate the atmosphere of a schoolroom and become a fruitful source of disease. It is a well-known fact that bacteria enter the human system chiefly through the oral cavity, where, if permitted through negligence to remain, they increase with astonishing rapidity, gradually coating the mucous membrane, affecting the breath, and frequently engendering diphtheria and other contagious diseases, the germs of which, as is well known, are usually first discovered in the mouth. What place more appropriate than the schoolroom, therefore, for instilling into the mind of youth the necessity for cleanliness of the teeth and mouth?

The teeth and mouth, when neglected, are, therefore, the most direct means of spreading contagion in the schoolroom. In enumerating the reasons for

introducing dental hygiene into the schools, I do not here dwell upon the element of beauty, of which the teeth are so important a requisite; nor do I emphasize the importance of perfect and regular teeth as a means of correct articulation. In view of the startling facts recently brought to light concerning the deplorable condition of the teeth among our younger generation, an exposition of the æsthetic side of the question would almost seem superfluous.

The public investigations conducted abroad during the past years demonstrate that the almost incredible condition of children's teeth everywhere is not due solely to neglect, but also to heredity—an additional reason for the timely exercise of hygienic safeguards. Most of the statistics furnished are those of school children, and should, therefore, have particular significance for us.

Among 10,517 school children of about twelve years of age, examined by Cunningham in England and Scotland, 35,279 diseased teeth were found; only about 1,500 of these children, or approximately 14 per cent., having sound teeth. On another occasion, out of 39,379 pupils examined by Cunningham, one of the pioneers of dental examinations in Great Britain, 10,500, or about one-third, had teeth in various stages of decay. The figures for another examination conducted by this expert

are still more astonishing, and show that of the teeth of 8,175 young people between the ages of four and eighteen, 95 per cent. were defective.

As regards the figures for Italy, where examinations were conducted by Platschick, the report for Milan alone shows that of 12,018 children examined in that city, 92 per cent. had teeth in various stages of decay.

In Germany more extensive examinations have been conducted. One of these was extended to about 15,000 school children between the ages of six to fifteen, with the result that 95 per cent. showed the presence of dental caries. The report states that "372 anomalies of a different character were found, such as hare-lip, cleft palate, irregularities, V-shaped jaw, and the like." The following table more specifically illustrates the result of this examination and affords convincing proof of the almost incredible ignorance and neglect concerning dental hygiene on the part of parents:

TABLE OF EXAMINATIONS CONDUCTED IN GERMAN SCHOOLS.

Age of Pupils	Number examined	No. with perf. teeth	Percentage with perf. teeth	Percentage with caries
6 to 8 years	6,060	407	3.8	93
9 " 10 "	3,518	268	3.4	96.6
12 " 15 "	5,157	172	5.5	94.5

In view of what has been said of the far-reaching

consequences resulting from dental neglect, the above figures are appalling. Still more so are those given for special cities where examinations have been conducted immediately. Among 3,000 school children examined in Strasburg only 165 had perfectly sound teeth. At Freiberg, where 8,000 children were examined, 99 per cent. were found to have teeth in various stages of decay. The figures for Leipzig are still more significant. There, Hopper examined only anterior teeth, which in children are usually exempt from caries, with the result that 1,000 out of 3,000 of these teeth were found to be in various stages of decay, 55 per cent. of the children presenting ganglionic swelling of dental origin. In Hamburg, twelve good dentures were met with among 355 children. Upon the whole, the examinations in Germany showed that, in the best localities, 78 per cent. of the young people had diseased teeth, and that in districts where calcium is scarce, the figures were increased to 99 per cent.

As these school children become older, the destructive action of dental decay becomes more evident. This fact has been demonstrated by examinations held in the schools of Russia, the results of which are shown in the subjoined table.*

* The author begs to acknowledge his obligation to the "Dental Cosmos Digest," and various other special works and reviews, for valuable statistical material submitted in this work.

Age of Pupils	Percentage with caries	Decayed teeth per head
8 to 12 years	78.9	3
12 " 16 "	86.6	4.5
16 " 20 "	92.4	5 to 6

It was in "barbarous" Russia that dental investigations were conducted as early as 1879, with the result that 80 per cent. of the inhabitants of St. Petersburg were found to have defective or decayed teeth. Is it not an object lesson for us, the people of New York, that, in 1897, the Pedagogical Council of the College of that far-distant city of Batoum should already have provided that the scholars' teeth should be regularly examined by dentists? In the higher military schools of Russia dental offices have been established, where every available means is employed to preserve organs which are there considered of the most vital importance to health. In 1896 Russian dentists went so far as to formally petition the Minister of the Interior to organize a regular department of dental hygiene throughout the empire. A striking proof of the estimate in which teeth are held in Russia was recently furnished by the Civil Court of St. Petersburg, which awarded the extraordinary sum of $50,000 to a singer for the loss of five teeth in a railway accident.

If these things can be done in Russia, why can

they not be done in the United States where the need is far greater? The experience of American dentists will fully justify the assertion that more than 50 per cent. of people in this country above the age of forty-five are to-day wearing artificial teeth. Such, indeed, are the conditions at present prevailing that it is hardly an exaggeration to declare that we are rapidly becoming a toothless people. Moreover, it is necessary to consider that, particularly in the large cities of the United States, we are dealing with a heterogeneous population, which is constantly being augmented by accessions from abroad—accessions which are drawn largely from the poor and ignorant classes of Germany, Scandinavia, Italy, Hungary, Bohemia, Russia, and other foreign countries. Quite apart from this, however, the crowded condition of the teeth of the average American child—and I here refer to the native-born element—is, in itself, if neglected, one of the most fruitful sources of early dental decay.

The only way to strike at the root of the evil is to begin in the schoolroom. It is hardly to be expected that the example recently furnished by a private citizen of Hamburg will be followed by boards of education in the United States. The Gustave Mellin institution, of Hamburg, named in honor of its founder, and provided with an endowment of

half a million marks, has been established for the sole purpose of treating the teeth of poor schooi children of the city free of charge. As this fund has not proved sufficient, however, the government has been petitioned to lend further pecuniary aid in order to arrest the ravages of dental caries. What can and should be done in the United States, and what devolves upon us as an imperative duty, is to inculcate into the mind of the child the fundamental principles of dental hygiene.

It is in the schoolroom that the future American is formed. Here all the heterogeneous elements of our population are assembled; and here their entire education is supervised and controlled by the properly constituted authorities. As lecturer on dental hygiene for many years, I have gathered the experience that the parents themselves are deeply interested in this branch of education and would cordially welcome a regular course in dental hygiene as part of the curriculum. That such a course would react beneficially upon the home itself is also beyond question. The mind of the child—provided that instruction be properly given—is far more susceptible than that of the adult; and while lectures are productive of much good, they only reach a comparatively small part of the population, whereas a course in oral hygiene would perma-

nently affect our entire generation. While it is improbable, and perhaps impracticable, in the light of present conditions, that dental treatment will be extended to the children visiting our schools, the knowledge diffused concerning preventive and curative hygiene, as well as the salutary effect of such knowledge indirectly upon the home, would undoubtedly be attended by far-reaching results.

That these results could be accurately determined by regular dental examinations, conducted by competent professional men in the schools, is likewise certain. The tests concerning the condition of the organs affecting the most vital, and certainly, so far as these organs themselves are concerned, most neglected, physical functions, could be conducted very expeditiously. They would consume an infinitesimal amount of time as compared to the examinations on the various mental qualifications; and would they not be equally important?

I have hitherto discussed this matter from the standpoint of the professional dentist, and have endeavored to demonstrate its fundamental importance as affecting the health and well-being of our growing generation. The best argument in its favor, given from the broad standpoint of the educator, is that embodied in the well-known work of Herbert Spencer entitled "Education, Intellectual,

Moral and Physical." "What knowledge is of most worth?" inquires the author. "That knowledge or education which subserves direct self-preservation by preventing the loss of health." After expatiating at some length upon the primary value of hygienic education, the author makes the extremely apt and humorous assertion that "men who would blush if caught saying 'Iphige'nia,' instead of 'Iphigen'ia,' show not the slightest shame in confessing that they do not know where the Eustachian tubes are, what are the actions of the spinal chord, what is the normal state of pulsation, or how the lungs are inflated."

Herbert Spencer advocates a course in physiology as of primary importance; and it may be urged that such a course has already been introduced into many of our schools throughout the country. Now, physiology is a very broad subject, and a general survey of it, while undoubtedly essential, must necessarily be very superficial. Thus, chapters of vital and fundamental importance will frequently cover about the same amount of space in our text-books as those which merely derive their value from their general relation to the subject as a whole.

What is more important, to know the location and purpose of the Eustachian tubes, or to have a clean mouth which shall not contaminate the at-

mosphere of the entire schoolroom and exhale the germs of disease, and a sound set of teeth with a fairly accurate knowledge of their nature, value, and the means requisite to their preservation? Another reason for the inadequacy of these text-books is that they are designed for the more advanced grades, whereas it is of primary importance that the pupil should have a knowledge of the elements of dental and oral hygiene as soon as he knows how to read. That the language in which these books on physiology are written would be incomprehensible to pupils in the higher primary grades is also beyond question. The greatest of all drawbacks to them, however, is the thoroughly ambiguous and frequently erroneous character of the definitions on the teeth as therein given.

A convincing and sweeping illustration of the last-mentioned statement was afforded last year by the investigation concerning these text-books set on foot by the Dental Society of Reading, Pennsylvania. Fifty-two dental surgeons throughout the State—approximately one for every county—were commissioned to examine the various text-books on physiology used in the schools. The following are a few selections from seven of these books as submitted by the examining dental surgeons and published in the "Dental Cosmos" for December, 1901:

1. In a young child the two bicuspids resemble the molar teeth of the adult, and the three molars are absent.

2. Teething seldom causes sickness in a healthy child.

3. At about the age of six a whole new set begins to grow beneath the first set.

4. The permanent teeth are fully developed in the jawbones beneath the temporary set before they appear.

5. Around the root is a thin layer of bone called cement.

6. The wisdom tooth does not appear until the 18th year.

7. Each tooth is set into the jawbone like a post into a hole.

8. The roots of the teeth sink into the bony sockets much like a nail in a piece of wood.

9. Destruction of enamel at any point exposes the entire cavity and decay results.

10. The teeth are similar on the two sides of the mouth, and are the same in the upper and lower jaws.

Quite apart from the vague character of these definitions and the frequent errata found in the

books examined, not a single physiology mentions the word "antiseptic"; so that the most important element involved is entirely overlooked. The examination afforded convincing proof of the fact that we are living in an age of specialization, and that material on so important a subject as dental hygiene, especially when designated for laymen or for the use of children, should be prepared by those professionally qualified for the task and equipped with a thorough knowledge of the requirements of the schoolroom.

Here, then, we have a number of reasons why special instructions on the care of the teeth and mouth should constitute a permanent feature of our school curriculum, even though such instruction be limited to a brief reading lesson of half an hour three times a week.

That the subject is not an unattractive one, even to very young pupils, I have reason to know from the personal reports of teachers; that the parents are interested in the matter has already been shown; and that the school boards throughout the country are gradually becoming alive to the importance of the matter here involved is also evident. As one of the earlier agitators in the field, I well remember the complete apathy and indifference with which, at first, all efforts tending toward a recognition of

the importance of the subject by the heads of schools was greeted. One of the principal objections urged was the apparent inability to prepare instructive material of palatable form, and sufficient in quantity to warrant its adoption as a special branch of study; and when this difficulty was adequately met, other arguments were brought forward, all of which may be epitomized in a single sentence—the overcrowding of the curriculum.

The overcrowding of the school course has been urged as an objection in certain quarters, both as regards dental examinations and the far more important matter of instruction in dental hygiene. One city claims that dental examinations would furnish a precedent for others aiming at the establishment of the physical condition of other organs. Why, then, let me ask, have these examinations been introduced into Russia, Germany, Japan, England, France, Italy, Belgium, Sweden and Denmark? In face of the statistics revealed abroad and the far worse conditions known to exist in many portions of this country, such a plea as the above is preposterous. Despite these occasional objections, however, the movement on behalf of dental examinations is steadily progressing, as evidenced by the fact that even that far Western city of Spokane, Washington, has recently appointed nine

dentists to examine the teeth of the school children of the city.

As regards the school curriculum itself, the question becomes one of the relative importance of studies. The Board of Education of New York City, recognizing the pressure of the times and realizing the tremendous importance of subjects of immediate utility, has recently made a number of salutary changes, making room, for example, for stenography and other branches designed to enable the pupil on leaving school to obtain a livelihood. Deeper than the question of utility, however, and underlying it, is that affecting the future well-being of the individual; and there is no factor deeper, nor more fundamental in this regard, than that bearing upon the preservation of the teeth. To this end the school must co-operate with the family; and, inasmuch as it has been here convincingly demonstrated by statistics that the family cannot be relied upon to safeguard what may, perhaps, be considered as one of the most vital physical functions, it devolves upon the school to inculcate the principles of dental hygiene.

PRESS COMMENTS

Under this title we have a hundred pages devoted to the exposition in popular style of useful knowledge pertaining to dentistry; useful to the lay reader, and at the same time furnishing the dental practitioner with not a few valuable hints as to his relations with types of patients. Certainly the work of many would be rendered lighter were the information contained in this small volume acquired by patients. . . . Not the least service to be derived from such a work is the cure of some of the bickering which at times annoys the professional man. Every dentist should have a copy in his reception room.

March, 1894. *Dental Cosmos,* Philadelphia, Pa.

This little volume of over one hundred pages was, as its title indicates, written for the purpose of diffusing general information upon a subject that should interest every man, woman and child. There is no question that the condition of the oral cavity has a very important influence upon the general health, aside from the very idea of comfort and external appearance. If the knowledge which it contains could be conveyed to every parent, there is no doubt that it might result in a lengthening of the average term of existence.

Especially should the simple truths which the book inculcates be taught to every school child. Works on general hygiene and physiology are included in school text-books, but here are some of the most essential truths in both, together with much other special knowledge, in a condensed form, and in such guise as will prove interesting even to children. Some such work should be included in the curriculum of our common schools.

There is much in this book that would prove of benefit to the practitioner. It is simple and easy in its diction, and very attractive in its general appearance. Its place in the dental office is upon the center table, where it may be perused with pleasure and profit by waiting patients. Under such conditions its high ethical tone would tend greatly to the profit of every competent dentist.

April, 1894. *Dental Practitioner,* Buffalo, N. Y.

. . . The last chapter on "Quackery" is very good, and it would be well if all could read it and profit by it. If the book can be circulated where most needed, it would do a great amount of good.

May, 1894. *Southern Dental Journal,* Macon, Ga.

. . . If it were within the limits of reasonable expectation an effort should be made to bring the book before the public who have use for the services of a dentist, and if read intelligently by them, they would begin to understand something of the requirements of many cases.

April, 1894. *Pacific Dental Journal,* Tacoma, Wash.

. . . Dr. Victor C. Bell, of this city, has published a popular treatise upon a subject which is of engrossing interest to every mother. The work is the outgrowth of practical experience, and the author justly says that for years he has noted and deplored the lack of information upon dental subjects that is displayed by otherwise intelligent people. He has supplied a real want by his lucid and well considered work.

June, 1894. *Babyhood,* New York.

. . . This little book has just appeared, comprising about one hundred pages.

It is written to diffuse a more general knowledge of dentistry to the layman, and seeks to fill a long-felt want.

It is abundantly illustrated and gives numerous recipes for lotions and dental powders.

It is only necessary to refer to the chapter on microorganisms, which has been copied from Prof. Miiller, of Berlin, to see that the author's desire to give an up-to-date work has been accomplished.

We welcome the first edition with all its merits and demerits.

May 5, 1894. *Medical Record,* New York.

. . . It [the book] contains a mass of information concerning matters vital to every man and woman, and it is stated in such a terse and vigorous way that it makes attractive reading. I can give it my unqualified approval.—Prof. W. C. Barrett, of Buffalo.

Perhaps one of the greatest difficulties met with in dentistry has been the ignorance of the general public, both in regard to personal care of teeth as well as the value of dental services. A half-century ago this was the chief stumbling-block in the practice of that period, for at that time the majority of persons had no higher conception of a dentist's duty than as a "puller of teeth," and it is therefore not surprising that dental services then were mainly confined to this.

Since that period a great change has been effected, but so much is still to be desired in this direction that any effort made to enlighten the general public must be received with pleasure. Hence Dr. Bell's effort is one of the most satisfactory of any in this direction.

The book, as a whole, can be cordially commended.

April, 1894. *International Dental Journal,* Phila., Pa.

The work consists of twelve chapters and about one hundred pages. It discusses briefly and quite clearly, Cleanliness of the Teeth, Filling, Extraction, Artificial Teeth, Children's Teeth, Crown and Bridgework, Advice to Mothers, etc., in a way that cannot be otherwise than profitable to the general reader. To give information upon these subjects to the public has long been regarded by the profession as a very important matter. Were the people properly informed of the value of the teeth to the animal economy, and what can be done for their preservation, and be made sufficiently to appreciate them in all respects, there would be vastly less of disease of the mouth and teeth and loss of the latter than is now realized.

This work, if it could be distributed among the public, would certainly do much towards furthering a knowledge of and appreciation for the teeth.

Dr. Bell will doubtless have the thanks of the profession for this book, and we would heartily commend it to every dentist for use in his reception room.

March, 1894. *Dental Register,* Cincinnati, O.

. . . A few copies for gratuitous circulation would be seed well sown.

April, 1894. *Items of Interest,* Philadelphia, Pa.